

US EPA RECORDS CENTER REGION 5



468086

# **SAMPLING DATA**

TABLE 4  
UNCONSOLIDATED MATERIAL MONITORING WELL ANALYTICAL SUMMARY  
ALBION-SHERIDAN TOWNSHIP LANDFILL  
ALBION, MICHIGAN

1 of 4

Sample ID Location Sample Type Sample date Units	Quantitation  Limit (QL)  ug/L	Maximum Contaminant Level*  ug/L	MI Act 451 Part 201 Ind./Comm. Cleanup Criteria** ug/L	MI Act 451 Part 201 Residential Cleanup Criteria** ug/L	MW01SG08139600S  MW01SG Groundwater (GW) 8/13/96 ug/L	MW02SG08139600S  MW02SG GW 8/13/96 ug/L	MW03SG08149600S  MW03SG GW 8/14/96 ug/L
<b>Volatile Organic Cmpds.</b>							
Acetone	100		2,100	730	R	R	R
Carbon disulfide	50		2,300	800			
Chloroethane	1.0		910	220			
Methylene chloride	1.0	5	5	5	1.0U	1.0U	
Toluene	1.0	1,000	1,000	1,000	0.44 J		
Vinyl chloride	1.0	2	2	2			I
<b>BNA Cmpds.</b>							
bis (2-Ethylhexyl) phthalate	5.0	6	6	6			
<b>Dissolved Metals</b>							
Cadmium	0.50	5	5	5			
Arsenic	5.0	50	50	50			
Barium	200	2,000	2,000	2,000			276
Calcium	5000				110,000	93,800	145,000
Antimony	5.0	6	6	6	5.7		
Iron	100		300#	300#		248	4,320
Potassium	5000						22,600
Magnesium	5000		1,200,000	420,000	24,700	24,700	53,200
Manganese	20.0		500	180		194	352
Sodium	5000		450,000	160,000		54,100	141,000
Zinc	20.0		2,400	2,400			

**Notes:**

Blank cell - Non-detected at presented quantitation limit.

J - Result is below quant. limit or has been qualified as estimated due to QC outlier(s).

UJ - Non-detected at reported QL. QL has been qualified as estimated due to QC outlier(s).

U - Result qualified as non-detected at reported QL due to potential lab or field cont.

R - Unusable result due to QC outlier(s).

\*- Drinking Water Regulations and Health Advisories. Office of Water, U.S. EPA. May 1995.

\*\* Health based drinking water value (Revision 2 - June 5, 1995).

# Aesthetic drinking water value (Revision 2 - June 5, 1995).

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ALBION, MICHIGAN

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Sample ID Location Sample Type Sample date Units	Quantitation Limit (QL) ug/L	Maximum Contaminant Level* ug/L	MI Act 451 Part 201 Ind./Comm. Cleanup Criteria** ug/L	MI Act 451 Part 201 Residential Cleanup Criteria** ug/L	MW03SG08149600D MW03SG GW 8/14/96 ug/L	MW05SG08139600S MW05SG GW 8/13/96 ug/L	MW06SG08149600S MW06SG GW 8/14/96 ug/L	FD-3 MW06SG GW 8/14/96 ug/L
<b>Volatile Organic Cmpds.</b>								
Acetone	100		2,100	730	R	R	R	R
Carbon disulfide	50		2,300	800				
Chloroethane	1.0		910	220				
Methylene chloride	1.0	5	5	5		1.0U		
Toluene	1.0	1,000	1,000	1,000				
Vinyl chloride	1.0	2	2	2	0.92 J			
<b>BNA Cmpds.</b>								
bis (2-Ethylhexyl) phthalate	5.0	6	6	6	1.4 J	6.4	2.6 J	
<b>Dissolved Metals</b>								
Cadmium	0.50	5	5	5				
Arsenic	5.0	50	50	50				
Barium	200	2,000	2,000	2,000	291			
Calcium	5000				143,000	79,900	64,300	59,000
Antimony	5.0	6	6	6				
Iron	100		300#	300#	4,050			
Potassium	5000				23,400			
Magnesium	5000		1,200,000	420,000	52,400	21,400	14,400	13,200
Manganese	20.0		500	180	342	183	79	72.6
Sodium	5000		450,000	160,000	142,000	34,800		
Zinc	20.0		2,400	2,400				

**Notes:**

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ALBION, MICHIGAN

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Sample ID Location Sample Type Sample date Units	Quantitation  Limit (QL)  ug/L	Maximum Contaminant Level*  ug/L	MI Act 451 Part 201 Ind./Comm. Cleanup Criteria** ug/L	MI Act 451 Part 201 Residential Cleanup Criteria** ug/L	MW07SG08159600S  MW07SG GW 8/15/96 ug/L	MW08SG08159600S  MW08SG GW 8/15/96 ug/L	MW09SG08159600S  MW09SG GW 8/15/96 ug/L
<b>Volatile Organic Cmpds.</b>							
Acetone	100		2,100	730	R	R	R
Carbon disulfide	50		2,300	800			
Chloroethane	1.0		910	220	1.0		
Methylene chloride	1.0	5	5	5			
Toluene	1.0	1,000	1,000	1,000			
Vinyl chloride	1.0	2	2	2			
<b>BNA Cmpds.</b>							
bis (2-Ethylhexyl) phthalate	5.0	6	6	6		3.5 J	
<b>Dissolved Metals</b>							
Cadmium	0.50	5	5	5			
Arsenic	5.0	50	50	50	13.2		
Barium	200	2,000	2,000	2,000	222		
Calcium	5000				108,000	46,400	73,600
Antimony	5.0	6	6	6			
Iron	100		300#	300#	2,480		
Potassium	5000				25,300		
Magnesium	5000		1,200,000	420,000	35,600	12,600	20,400
Manganese	20.0		500	180	1,270		38.1
Sodium	5000		450,000	160,000	64,600		5,310
Zinc	20.0		2,400	2,400			

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ALBION-SHERIDAN TOWNSHIP LANDFILL  
ALBION, MICHIGAN

4 of 4

Sample ID Location Sample Type Sample date Units	Quantitation  Limit (QL)  ug/L	Maximum Contaminant Level*  ug/L	MI Act 451 Part 201 Ind./Comm. Cleanup Criteria** ug/L	MI Act 451 Part 201 Residential Cleanup Criteria** ug/L	MW10SG08159600S  MW10SG GW 8/15/96 ug/L	MW12SG08159600S  MW12SG GW 8/15/96 ug/L	MW13SG08159600S  MW13SG GW 8/15/96 ug/L
<b>Volatile Organic Cmpds.</b>							
Acetone	100		2,100	730	R	R	R
Carbon disulfide	50		2,300	800	0.41 J		
Chloroethane	1.0		910	220			
Methylene chloride	1.0	5	5	5			
Toluene	1.0	1,000	1,000	1,000		0.76 J	
Vinyl chloride	1.0	2	2	2			
<b>BNA Cmpds.</b>							
bis (2-Ethylhexyl) phthalate	5.0	6	6	6			5.0UJ
<b>Dissolved Metals</b>							
Cadmium	0.50	5	5	5			
Arsenic	5.0	50	50	50			
Barium	200	2,000	2,000	2,000			
Calcium	5000				90,500	70,500	90,500
Antimony	5.0	6	6	6		5.6	
Iron	100		300#	300#		140	
Potassium	5000						
Magnesium	5000		1,200,000	420,000	26,700	11,800	24,800
Manganese	20.0		500	180	94.9	132	465
Sodium	5000		450,000	160,000	19,000	7,970	6,890
Zinc	20.0		2,400	2,400			

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TABLE 5  
BEDROCK MONITORING WELL ANALYTICAL SUMMARY  
ALBION-SHERIDAN TOWNSHIP LANDFILL  
ALBION, MICHIGAN

1 of 7

Sample ID Location Sample Type Sample date Units	Quantitation  Limit (QL)  ug/L	Maximum Contaminant Level*  ug/L	MI Act 451 Part 201 Ind./Comm. Cleanup Criteria** ug/L	MI Act 451 Part 201 Residential Cleanup Criteria** ug/L	MW01SB08139600S MW01SB Groundwater (GW) 8/13/96 ug/L	MW01WB08139600S MW01WB GW 8/13/96 ug/L	MW02SB08139600S MW02SB GW 8/13/96 ug/L
<b>Volatile Organic Cmpds.</b>							
Acetone	100		2,100	730	R	R	R
Benzene	5.0	5	5	5			
Carbon disulfide	50		2,300	800			
Methylene chloride	1.0	5	5	5	1.0U	1.0U	1.0U
Vinyl chloride	1.0	2	2	2			
<b>BNA Cmpds.</b>							
bis (2-Ethylhexyl) phthalate	5.0	6	6	6			6J
<b>Dissolved Metals</b>							
Cadmium	0.50	5	5	5			
Arsenic	5.0	50	50	50			
Barium	200	2,000	2,000	2,000			
Calcium	5000				99,200	120,000	78,700
Antimony	5.0	6	6	6			
Iron	100		300#	300#	569	974	
Potassium	5000					7,120	37,000
Magnesium	5000		1,200,000	420,000	26,300	30,400	20,000
Manganese	20.0		500	180	149	333	
Sodium	5000		450,000	160,000	47,100	109,000	5,990
Zinc	20.0		2,400	2,400			69.9U

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# Aesthetic drinking water value (Revision 4 - June 5, 1995).

**Table 2**  
**Unconsolidated Material Monitoring Well Field Parameter Summary**  
**Albion-Sheridan Township Landfill**  
(Units in Feet)

Well ID	Date	T.O.C. Elevation	Depth of Water	Elevation of Water	Volume Purged (gal.)	pH (S.U.)	Specific Cond. (us)	Temperature (C°)	Eh (mV)	DO (%)
MW1SG	13-Aug	982.36	33.37	948.99	4.5	6.83	670	12.5	1167	
MW2SG	13-Aug	977.93	28.76	949.17	4.25	7.43	712	12	90	5.3
MW3SG	14-Aug	978.88	32.52	946.36	7.0	6.35	1612	13	64	38
MW4SG	14-Aug	978.03	32.16	945.87	4.5	6.5	529	14	127	23
MW5SG	13-Aug	970.69	22.18	948.51	4.5	7.43	611	12	100	10
MW6SG	14-Aug	969.73	22.87	946.86	4	6.36	365	13	62	48
MW7SG	15-Aug	963.91	17.66	946.25	5	6.51	1333	13	145	15
MW8SG	15-Aug	980.58	25.56	955.02	4.5	6.45	316	12	62	44
MW9SG	15-Aug	959.47	13.93	945.54	4	6.39	524	13	30	11
MW10SG	15-Aug	949.98	4.79	945.19	2.5	6.77	679	14	166	24
MW11SG	15-Aug	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW12SG	15-Aug	950.57	6.28	944.29	1.5	6.6	457	17	81	49
MW13SG	15-Aug	949.49	4.27	945.22	6	6.61	642	15	34	46

NS: Not sampled - well destroyed.  
SG: Shallow Glacial  
Eh: Oxidation Reduction Potential  
DO: Dissolved Oxygen

**Table 3**  
**Bedrock Monitoring Well Field Parameter Summary**  
**Albion-Sheridan Township Landfill**  
(Units in Feet)

Well ID	Date	T.O.C.* Elevation	Depth of Water	Elevation of Water	Volume Purged (gal.)	pH (S.U.)	Specific Cond. (us)	Temperature (C°)	Eh (mV)	DO %
MW01WB	13-Aug	982.20	33.76	948.44	14.0	7.54	1240	13	106	12
MW01SB	13-Aug	982.2	33.81	948.39	10.0	7.7	924	13	111	3
MW02WB	13-Aug	977.33	28.49	948.84	14.0	8.03	897	13.5	64	9
MW02SB	13-Aug	977.62	29.1	948.52	20.0	7.81	913	15	74	10
MW03WB	14-Aug	978.65	32.76	945.89	15.0	7.09	1571	14	97	31
MW03SB	14-Aug	978.15	32.16	945.99	19.5	7.33	1019	14	111	21
MW4SG	14-Aug	978.03	32.16	945.87	4.5	6.5	529	14	127	23
MW04WB	14-Aug	977.73	31.87	945.86	15.5	6.4	1094	15	123	40
MW04SB	14-Aug	978.03	32.19	945.84	21.5	6.46	1842	14	141	23
MW04DB	14-Aug	977.8	32.04	945.76	35.0	6.48	884	15	127	15
MW05SB	13-Aug	970.01	23.45	946.56	11.5	7.34	721	13	106	3
MW06WB	14-Aug	969.81	24.28	945.53	15.0	6.32	1001	14	128	16
MW06SB	14-Aug	969.77	23.93	945.84	23.0	6.36	1126	14	148	18
MW07WB	15-Aug	963.64	18.88	944.76	15.5	6.68	591	13	142	12
MW07SB	15-Aug	962.88	17.12	945.76	23.0	6.22	497	13	64	24
MW08WB	15-Aug	981.83	35.9	945.93	20.0	6.36	937	13	130	12
MW08SB	15-Aug	7-Sep	35.9	945.93	20.0	6.36	937	13	130	12
MW09WB	15-Aug	959.48	13.92	945.56	18.0	6.29	1022	13	138	8
MW09SB	15-Aug	960.06	14.23	945.83	23.5	6.43	1245	13	135	2
MW16SB	15-Aug	951.83	6.48	945.35	15.5	6.77	941	12	145	23
MW16DB	15-Aug	951.85	6.36	945.49	35.0	6.83	569	12	128	37

\* Except for MW16 elevations, T.O.C. elevations were obtained from the Remedial Investigation Report (WWES April, 1994)

WB: Weathered Bedrock.

SB: Shallow Bedrock.

DB: Deep Bedrock.

Eh: Oxidation Reduction Potential

DO: Dissolved Oxygen

TABLE 5  
BEDROCK MONITORING WELL ANALYTICAL SUMMARY  
ALBION-SHERIDAN TOWNSHIP LANDFILL  
ALBION, MICHIGAN

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Sample ID Location Sample Type Sample date Units	Quantitation Limit (QL) ug/L	Maximum Contaminant Level* ug/L	MI Act 451 Part 201 Ind./Comm. Cleanup Criteria** ug/L	MI Act 451 Part 201 Residential Cleanup Criteria** ug/L	MW02WB08139600S MW02WB GW 8/13/96 ug/L	MW03SB08149600S MW03SB GW 8/14/96 ug/L	MW03WB08149600S MW03WB GW 8/14/96 ug/L
<b>Volatile Organic Cmpds.</b>							
Acetone	100		2,100	730	R	R	R
Benzene	5.0	5	5	5			
Carbon disulfide	50		2,300	800			
Methylene chloride	1.0	5	5	5	1.0U		
Vinyl chloride	1.0	2	2	2			0.85 J
<b>BNA Cmpds.</b>							
bis (2-Ethylhexyl) phthalate	5.0	6	6	6			5.5J
<b>Dissolved Metals</b>							
Cadmium	0.50	5	5	5			
Arsenic	5.0	50	50	50			
Barium	200	2,000	2,000	2,000			350
Calcium	5000				94,300	137,000	148,000
Antimony	5.0	6	6	6	6.4U		
Iron	100		300#	300#		876	5,330
Potassium	5000						24,000
Magnesium	5000		1,200,000	420,000	24,200	35,100	51,700
Manganese	20.0		500	180	305	96.4	297
Sodium	5000		450,000	160,000	56,100	39,100	151,000
Zinc	20.0		2,400	2,400			

**Notes:**

Blank cell - Non-detected at presented quantitation limit.

J - Result is below quant. limit or has been qualified as estimated due to QC outlier(s).

UJ - Non-detected at reported QL. QL has been qualified as estimated due to QC outlier(s).

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<b>Volatile Organic Cmpds.</b>								
Acetone	100		2,100	730	R	R	4.2 J	R
Benzene	5.0	5	5	5			0.96 J	
Carbon disulfide	50		2,300	800				
Methylene chloride	1.0	5	5	5				
Vinyl chloride	1.0	2	2	2				
<b>BNA Cmpds.</b>								
bis (2-Ethylhexyl) phthalate	5.0	6	6	6				
<b>Dissolved Metals</b>								
Cadmium	0.50	5	5	5				
Arsenic	5.0	50	50	50			10	15.8
Barium	200	2,000	2,000	2,000	7.9	8.8	331	248
Calcium	5000						83,900	83,900
Antimony	5.0	6	6	6	66,900	71,300		
Iron	100		300#	300#				1,100
Potassium	5000				1,810	1,940	45,400	18,600
Magnesium	5000		1,200,000	420,000			36,800	31,600
Manganese	20.0		500	180	16,900	18,100	90.7	71.9
Sodium	5000		450,000	160,000	287	306	82,200	66,800
Zinc	20.0		2,400	2,400			51.9 U	

**Notes:**

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<b>Volatile Organic Cmpds.</b>							
Acetone	100		2,100	730	R	R	R
Benzene	5.0	5	5	5			0.52 J
Carbon disulfide	50		2,300	800			
Methylene chloride	1.0	5	5	5		1.0U	
Vinyl chloride	1.0	2	2	2			0.49 J
<b>BNA Cmpds.</b>							
bis (2-Ethylhexyl) phthalate	5.0	6	6	6			
<b>Dissolved Metals</b>							
Cadmium	0.50	5	5	5			1
Arsenic	5.0	50	50	50			130
Barium	200	2,000	2,000	2,000			249
Calcium	5000				93,800	105,000	83,600
Antimony	5.0	6	6	6			
Iron	100		300#	300#	547	603	3,330
Potassium	5000					6,420	42,600
Magnesium	5000		1,200,000	420,000	26,200	31,300	36,400
Manganese	20.0		500	180	55.5	88.6	135
Sodium	5000		450,000	160,000	8,310	15,800	66,400
Zinc	20.0		2,400	2,400	29.6		

**Notes:**

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<b>Volatile Organic Cmpds.</b>							
Acetone	100		2,100	730	R	R	R
Benzene	5.0	5	5	5			
Carbon disulfide	50		2,300	800			
Methylene chloride	1.0	5	5	5			
Vinyl chloride	1.0	2	2	2	0.45 J		
<b>BNA Cmpds.</b>							
bis (2-Ethylhexyl) phthalate	5.0	6	6	6	2.3 J	5.0UJ	5.0UJ
<b>Dissolved Metals</b>							
Cadmium	0.50	5	5	5			
Arsenic	5.0	50	50	50	32.9		
Barium	200	2,000	2,000	2,000	245		
Calcium	5000				99,100	76,300 5,000	73,900
Antimony	5.0	6	6	6			
Iron	100		300#	300#	1,060		530
Potassium	5000				14,900		
Magnesium	5000		1,200,000	420,000	30,600	19,000	20,100
Manganese	20.0		500	180	95.7		137
Sodium	5000		450,000	160,000	53,200	19,900	18,400
Zinc	20.0		2,400	2,400			43

**Notes:**

Blank cell - Non-detected at presented quantitation limit.

J - Result is below quant. limit or has been qualified as estimated due to QC outlier(s).

UJ - Non-detected at reported QL. QL has been qualified as estimated due to QC outlier(s).

U - Result qualified as non-detected at reported QL due to potential lab or field cont.

R - Unusable result due to QC outlier(s).

\*- Drinking Water Regulations and Health Advisories. Office of Water, U.S. EPA. May 1995

\*\* Health based drinking water value (Revision 4 - June 5, 1995).

# Aesthetic drinking water value (Revision 4 - June 5, 1995).

TABLE 5  
BEDROCK MONITORING WELL ANALYTICAL SUMMARY  
ALBION-SHERIDAN TOWNSHIP LANDFILL  
ALBION, MICHIGAN

6 of 7

Sample ID Location Sample Type Sample date Units	Quantitation  Limit (QL)  ug/L	Maximum Contaminant Level*  ug/L	MI Act 451 Part 201 Ind./Comm. Cleanup Criteria** ug/L	MI Act 451 Part 201 Residential Cleanup Criteria** ug/L	MW08SB08159600S  MW08SB GW 8/15/96 ug/L	MW08WB08159600S  MW08WB GW 8/15/96 ug/L	MW09SB08159600S  MW09SB GW 8/15/96 ug/L
<b>Volatile Organic Cmpds.</b>							
Acetone	100		2,100	730	R	R	R
Benzene	5.0	5	5	5			
Carbon disulfide	50		2,300	800			
Methylene chloride	1.0	5	5	5			
Vinyl chloride	1.0	2	2	2			0.87 J
<b>BNA Cmpds.</b>							
bis (2-Ethylhexyl) phthalate	5.0	6	6	6			1.4 J
<b>Dissolved Metals</b>							
Cadmium	0.50	5	5	5			
Arsenic	5.0	50	50	50			
Barium	200	2,000	2,000	2,000			352
Calcium	5000				119,000	54,800	124,000
Antimony	5.0	6	6	6			5.2
Iron	100		300#	300#	753	186	1,490
Potassium	5000						18,800
Magnesium	5000		1,200,000	420,000	32,900	14,500	40,200
Manganese	20.0		500	180	138	25.4	95.9
Sodium	5000		450,000	160,000	33,600		80,300
Zinc	20.0		2,400	2,400			

**Notes:**

Blank cell - Non-detected at presented quantitation limit.

J - Result is below quant. limit or has been qualified as estimated due to QC outlier(s).

UJ - Non-detected at reported QL. QL has been qualified as estimated due to QC outlier(s).

U - Result qualified as non-detected at reported QL due to potential lab or field cont.

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# Aesthetic drinking water value (Revision 4 - June 5, 1995).

TABLE 5  
BEDROCK MONITORING WELL ANALYTICAL SUMMARY  
ALBION-SHERIDAN TOWNSHIP LANDFILL  
ALBION, MICHIGAN

7 of 7

Sample ID Location Sample Type Sample date Units	Quantitation  Limit (QL)  ug/L	Maximum Contaminant Level*  ug/L	MI Act 451 Part 201 Ind./Comm. Cleanup Criteria** ug/L	MI Act 451 Part 201 Residential Cleanup Criteria** ug/L	MW09WB08159600S MW09WB GW 8/15/96 ug/L	MW16SB08159600S MW16SB GW 8/15/96 ug/L	MW16DB08159600S MW16DB GW 8/15/96 ug/L
<b>Volatile Organic Cmpds.</b>							
Acetone	100		2,100	730	R	R	R
Benzene	5.0	5	5	5			
Carbon disulfide	50		2,300	800	0.44 J		
Methylene chloride	1.0	5	5	5			
Vinyl chloride	1.0	2	2	2	0.49 J		
<b>BNA Cmpds.</b>							
bis (2-Ethylhexyl) phthalate	5.0	6	6	6			
<b>Dissolved Metals</b>							
Cadmium	0.50	5	5	5			0.5J
Arsenic	5.0	50	50	50		7.9	
Barium	200	2,000	2,000	2,000	207		
Calcium	5000				109,000	99,500	78,300
Antimony	5.0	6	6	6			
Iron	100		300#	300#		1,320	610
Potassium	5000				8,260	13,600	
Magnesium	5000		1,200,000	420,000	32,400	31,400	25,500
Manganese	20.0		500	180	95.6	202	36.6
Sodium	5000		450,000	160,000	54,600	51,900	15,400
Zinc	20.0		2,400	2,400			

**Notes:**

Blank cell - Non-detected at presented quantitation limit.

J - Result is below quant. limit or has been qualified as estimated due to QC outlier(s).

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\*- Drinking Water Regulations and Health Advisories. Office of Water, U.S. EPA. May 1995

\*\* Health based drinking water value (Revision 4 - June 5, 1995).

# Aesthetic drinking water value (Revision 4 - June 5, 1995).

DECLARATION  
SELECTED REMEDIAL ALTERNATIVE  
FOR THE  
ALBION-SHERIDAN TOWNSHIP LANDFILL SITE  
Albion, Michigan

Statement of Basis and Purpose

This decision document presents the selected remedial action and contingent remedial action for the Albion-Sheridan Township Landfill Site, Albion, Michigan, which were chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the administrative record for this Site. The State of Michigan concurs with this decision.

Assessment of the Site

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

Description of the Selected Remedy

The purpose of this remedy is to reduce the risks associated with exposure to the contaminated materials on-site and to eliminate or reduce migration of contaminants to the groundwater, and to reduce the risks associated with arsenic contamination in the groundwater. The remedy includes treatment of principal threat waste, but other contaminants will remain on-site above health-based levels. Human health and the environment will be protected from these remaining contaminants by capping the wastes.

The major components of the selected remedy include:

- Removal and off-site treatment and disposal of drums which contain hazardous and liquid wastes from Test Pit Area #9 and other drums encountered during grading of the landfill surface;
- Construction of a solid waste landfill cover (cap) which makes use of a Flexible Membrane Liner (FML) over the entire landfill mass;
- Use of institutional controls on landfill property to limit both land and groundwater use and on adjacent

property to limit only groundwater use until the clean-up standard is attained (estimated at 14 years);

- Installation of an active landfill gas collection system including flaring to treat the off-gas from the landfill, unless U.S. EPA approves passive venting following design studies;
- Monitoring of groundwater to ensure effectiveness of the remedial action in lowering the arsenic concentration in groundwater through natural oxidation.

The following contingent remedy for groundwater treatment is also selected for the site:

- Treatment of groundwater by in-situ oxidation if, five years after landfill cap installation, the arsenic contamination in the groundwater is not declining at the specified rate or if contamination threatens residential wells.

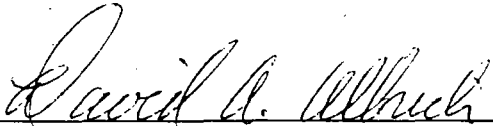
#### Statutory Determinations

The selected remedy and the contingent remedy for groundwater are both protective of human health and the environment, comply with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and are cost effective. The selected remedy and the contingent remedy both utilize permanent solutions and alternative treatment or resource recovery technologies to the maximum extent practicable. Both remedies also satisfy the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element.

A review will be conducted within five years after commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment because this remedy will result in hazardous substances remaining on site above health-based levels.

#### State Concurrence

The State of Michigan is in agreement with the selected remedy and the contingent remedy for this site and has provided U.S. EPA with a letter of concurrence.

  
Valdas V. Adamkus  
Regional Administrator

3/28/95  
Date

## STATE OF MICHIGAN



JOHN ENGLER, Governor

## DEPARTMENT OF NATURAL RESOURCES

STEVEN T. MASON BUILDING, PO BOX 30028, LANSING MI 48909-7528

ROLAND HARMES, Director

March 24, 1995

NATURAL RESOURCES  
COMMISSIONJERRY C. BARTNIK  
KEITH J. CHARTERS  
LARRY DEVUYST  
PAUL EISELE  
JAMES P. HILL  
DAVID HOLLI  
JOEY M. SPANO

Mr. Valdas V. Adamkus, R-19J  
Administrator, Region 5  
U.S. Environmental Protection Agency  
77 West Jackson Boulevard  
Chicago, Illinois 60604-3590

Dear Mr. Adamkus:

The Michigan Department of Natural Resources (MDNR), on behalf of the State of Michigan, has reviewed the draft Record of Decision (ROD) for the Albion-Sheridan Township Landfill Superfund site in Albion, Calhoun County, Michigan, which we received on February 9, 1995. We are pleased to inform you that we concur with the remedy outlined in the draft ROD for this site.

The major components of this remedy include:

- \* Removal and off-site treatment and disposal of drums which contain hazardous and liquid wastes from Test Pit Area #9 and other drums encountered during grading of the landfill surface;
- \* Construction of a solid waste landfill cover which makes use of a Flexible Membrane Liner;
- \* Use of institutional controls on landfill property to limit land and groundwater usage, and on adjacent property to limit groundwater usage until the cleanup standard is attained (estimated at 14 years);
- \* Installation of an active landfill gas collection system, including flaring to treat the off-gas from the landfill, unless the U.S. Environmental Protection Agency (EPA) approves passive venting following design studies; and
- \* Monitoring of groundwater to ensure effectiveness of the remedial action in lowering the arsenic concentration in groundwater through natural oxidation.

The following contingent remedy for groundwater treatment is also selected for the site:

- \* Treatment of groundwater by in-situ oxidation if, five years after landfill cap installation, the arsenic contamination in the groundwater is not declining at the specified rate or if contamination threatens residential wells.

Mr. Valdas V. Adamkus


-2-

March 24, 1995

At a minimum, this remedy will achieve the substantive requirements of a Type C cleanup under the Michigan Environmental Response Act (MERA), 1982 PA 307, as amended. However, the ROD only requires long-term monitoring until the cleanup standards are attained, plus five years of monitoring beyond that time to ensure that the standards continue to be met. Additional monitoring or remedial actions may be necessary in accordance with R 299.5719(1) of the MERA in order to assure the effectiveness and integrity of the remedial action beyond that time.

We look forward to the implementation of this remedy for the Albion-Sheridan Township Landfill Superfund site. If you have any questions, please feel free to contact Mr. William Bradford, Chief, Superfund Section, Environmental Response Division, at 517-373-8815, or you may contact me.

Sincerely,



Russell J. Harding  
Deputy Director  
517-373-7917

cc: Mr. James Mayka, EPA  
Ms. Leah Evison, EPA  
Mr. Alan J. Howard, MDNR  
Mr. William Bradford, MDNR  
Ms. Lisa Summerfield, MDNR  
Mr. James Myers, MDNR/Albion-Sheridan File (J2)

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## SUMMARY OF REMEDIAL ALTERNATIVE SELECTION

### A. SITE LOCATION AND DESCRIPTION

The Albion-Sheridan Township Landfill site (the "site") is an inactive landfill located at 29975 East Erie Road approximately one mile east of Albion, Michigan on the eastern edge of Calhoun County. The landfill is approximately 18 acres in area and its boundaries are shown in **Figure 1**.

### B. SITE HISTORY

From 1966 to 1981, the landfill was privately owned and operated by Mr. Gordon Stevick. The landfill accepted municipal refuse and industrial wastes from households and industries in the City of Albion and nearby townships. In the early 1970s, the Michigan Department of Natural Resources (MDNR) approved the landfill to accept metal plating sludges. Other materials, such as paint wastes and thinners, oil and grease, and dust, sand, and dirt containing fly ash and casting sand were also disposed of at the site. In 1980, the MDNR collected and analyzed samples of non-containerized sludges that were being disposed at the site. The sludges contained heavy metals, including chromium (250,000 mg/kg), zinc (150,000 mg/kg), nickel (1,000 mg/kg) and lead (280 mg/kg). The sludges remain buried at the site. The landfill ceased operation in 1981.

In 1986, a U.S. EPA Field Investigation Team (FIT) contractor, performed a Site Screening Inspection for purposes of scoring the site per the Hazard Ranking System (HRS). In 1988, U.S. EPA proposed the Albion-Sheridan Township Landfill Site for inclusion on the National Priorities List (NPL), and in 1989, the Albion-Sheridan Township Landfill Site was officially placed on the NPL and designated a Superfund site.

During 1988 and 1989, a U.S. EPA Technical Assistance Team conducted site inspections and observed surface debris on the landfill, including drums which appeared to contain grease and paint waste. Sampling showed that some drums contained wastes classified as hazardous under RCRA because they were toxic and ignitable. Some samples contained VOCs, including ethylbenzene, toluene, tetrachloroethylene, 1,1,1-trichloroethane, and xylene.

As a result of its findings up to 1989, U.S. EPA determined that a removal action was appropriate. On March 19, 1990, U.S. EPA issued a Unilateral Administrative Order to five potentially responsible parties (PRPs). On May 3, 1990, the UAO was amended to delete one of the parties.

Later in 1990, two PRPs performed the removal. They removed approximately 46 drums from the surface of the landfill. Twenty-

two of these were overpacked and sent to an off-site facility for incineration. The remaining 24 drums were crushed and sent to a Type 2 landfill.

In 1991, the Albion-Sheridan Township Landfill Site was selected as a demonstration site for the presumptive remedy for CERCLA municipal landfill sites, one of the tools of acceleration within the Superfund Accelerated Clean-up Model (SACM). OSWER Directives No. 9355.3-11 "Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites" and No. 9355.0-49FS "Presumptive Remedy for CERCLA Municipal Landfill Sites" establish containment as the presumptive remedy for CERCLA municipal landfills and provide guidance for streamlining the RI/FS process at these sites.

On June 3, 1991, U.S. EPA mailed special notice letters to six PRPs to begin negotiations for conducting a remedial investigation/feasibility study (RI/FS). No good faith offer was submitted by the deadline, and as a result, U.S. EPA performed the RI/FS using Superfund money.

U.S. EPA initiated the Remedial Investigation/ Feasibility Study (RI/FS) in January 1992. The work was performed by a contractor under the Alternative Remedial Contract Strategy (ARCS). U.S. EPA placed the completed reports in the Administrative Record in September 1994.

#### **C. COMMUNITY PARTICIPATION**

The Responsiveness Summary in Section L discusses the involvement of the community during the RI/FS and remedy selection process and shows that the public participation requirements of CERCLA Sections 113(k)(2)(i-v) and 117 have been met at this site. The decision is based on the Administrative Record.

#### **D. SUMMARY OF CURRENT SITE CONDITIONS**

The RI Report in the Administrative Record documents the methods and results of the remedial investigation at the Site and additional details concerning site conditions may be found in that document. A summary of U.S. EPA's findings is given below.

##### **1. Adjacent Land Use**

A combination of residential, agricultural, commercial, and industrial properties surrounds the Albion-Sheridan Township Landfill. One residence is located immediately adjacent to the landfill to the south and five additional residences are located approximately 1000 to 1500 feet southwest of the landfill along East Erie Road. An active railroad track borders East Erie Road

to the south of the landfill, and beyond the railroad tracks lies the North Branch of the Kalamazoo River. South of the river is agricultural land.

The site does not fall within the flood plain of the river. There are wetlands south of the site adjacent to the river, which are not expected to be impacted by site activities.

Amberton Village housing development is located adjacent to the site on the east side, with the closest residences approximately 500 feet from the landfill. Several residences and commercial businesses are located along Michigan Avenue approximately 500 feet north of the site. Immediately west of the site is undeveloped land formerly used for agriculture. Orchard Knoll subdivision is located approximately 1,500 feet northwest of the landfill. Approximately 2,000 feet northwest of the site is a landfill associated with Brooks Foundry. Approximately one mile west is the city of Albion, with a population of 10,066 according to the 1990 census. This figure does not include approximately 1,700 students enrolled at Albion College in the City of Albion.

## **2. Landfill**

The landfill is currently covered with 1 to 4 feet of silty sand and some gravel. Cover thickness averages approximately 2 feet. Refuse is present within the cover material at some locations, including sludge, glass fragments and insulation. The landfill surface is currently subsiding at rates of 0.04 feet to 0.13 feet per year. Refuse material is scattered at the ground surface throughout the landfill, particularly on slopes. This material includes metal, plastic, concrete, asphalt, 55-gallon drums, wood, tires, a storage tank, and a junk crane.

Surface geophysical data indicate that the landfill contains considerable metallic debris, consistent with what one would expect of disposal practices associated with a municipal landfill which accepted a variety of industrial wastes. Test pitting conducted by the MDNR uncovered one area of concentrated drum disposal, designated Test Pit Area 9 (TP-9), where an estimated 200 to 400 drums are present. MDNR test results show that some of the drums contain liquid and solid wastes and suspected paint sludges, including up to 2.7 ppm arsenic, 730,000 ppm 1,2,4-trimethyl benzene, 40,000 ppm m/p-xylene, 6,500 ppm acetone and 2,400 ppm aluminum. Test pitting results are summarized in a report entitled Technical Memorandum No. 1 prepared by ABB Environmental Services, Inc., dated September 14, 1994, which is included in the Administrative Record.

The landfill ranges from 16 to 35 feet in thickness. During drilling of wells, U.S. EPA encountered refuse which was interlayered with medium to fine sand. The refuse included paper, cardboard, plastic, various metals, cloth, newsprint,

rubber, leather, wood, glass, suspected foundry sand, styrofoam, and purple and white crystalline material.

U.S. EPA encountered landfill gases during installation of wells and subsidence monuments on the landfill, including some VOCs at concentrations greater than 10,000 ppm. Subsurface samples contained up to 1,500 ppm VOCs. Additional information regarding landfill gases may be found in Section 3 of the RI.

Samples of landfill waste from borings contained numerous contaminants, including 10 VOCs, 19 semi-volatile organic compounds (SVOCs), and 11 pesticides/PCBs. The most concentrated contaminant was 4-Methyl phenol at 15 mg/kg. Several inorganic substances were present above background levels in subsurface soils, including antimony, arsenic, chromium, copper, lead, mercury, and zinc. The highest concentrations include lead at 208 mg/kg, arsenic at 13.1 mg/kg and chromium at 13.5 mg/kg. One sample was suitable for the TCLP metals analysis. Results indicate the presence of barium and lead in the TCLP leachate, both below hazardous waste levels.

### 3. Groundwater

Groundwater flows beneath the site in the unconsolidated glacial sediments and the Marshall Formation sandstone. The top of the water table appears to have only minimal contact with the waste in the landfill. The landfill is dug into a series of unconsolidated sediments (sand, gravel, silt and clay) which ranges in thickness at the site between 20 and 50 feet. Groundwater in these unconsolidated sediments is in communication with the Marshall Formation bedrock. The upper 5 to 25 feet of the Marshall Formation is highly weathered and fractured. Groundwater flows fastest through a fractured, but less highly weathered zone just below that depth.

Groundwater flows generally to the west-southwest beneath the landfill and curves to the south near the North Branch of the Kalamazoo River (**Figure 2**). A leachate plume in the groundwater emanates from the southwest side of the landfill. Data from a geophysical traverse located south of the river (500 feet south of the landfill) did not indicate any groundwater contamination south of the river. Flow rates in the unconsolidated sediments average 106 feet/year and in the most conductive shallow bedrock average 45 feet/year. Vertical migration of shallow groundwater is generally downward beneath the landfill and upward south of the landfill near the river.

Approximately 10 residential and business wells are located within 2000 feet of the site, including two wells which serve the Amberton Village subdivision. Where well depth is known, residents near the site obtain groundwater from the Marshall Formation at depths between 70 and 350 feet. Three City of

Albion municipal wells are located approximately one mile west of the site and also obtain water from the Marshall Formation, as do other residences, businesses and industries in the region.

In October 1992, U.S. EPA sampled groundwater from 4 upgradient and 6 downgradient residential wells near the site. No site-related constituents were detected. Bis(2-ethyl hexyl)phthalate, a component of PVC piping, was detected at an estimated concentration of 1 ug/l in one upgradient residential well. There is no Federal Maximum Contaminant Level (MCL) for this compound, but the health-based clean-up standard used by the State of Michigan for this compound is 2.5 ug/l. The termiticide, heptachlor, was detected in 2 downgradient and 1 upgradient residential wells, at concentrations of 0.01 to 0.02 ug/l, well below the MCL of 0.4 ug/l. Numerous inorganic substances were detected at comparable levels in upgradient and downgradient residential wells, including naturally-occurring arsenic at 1-2 ug/l. None exceed MCLs and none are attributed to the landfill. A summary of constituents detected in residential well sampling may be found in Table 39 of the RI.

U.S. EPA installed a total of 31 monitoring wells at the site. Sampling results indicate that contaminants from the landfill have impacted ground water due to percolation of landfill leachate. Many monitoring wells had groundwater with contaminant exceedances of Michigan Admin. Code R. 299.5709 (Act 307 Type B) levels and four monitoring wells showed groundwater impact above MCLs.

A leachate plume extends southwest of the landfill for at least 900 feet (**Figure 3**) and extends vertically to a depth of approximately 45 feet below the water table. The major portion of the plume appears to be discharging to the North Branch of the Kalamazoo River, but does not result in loading concentrations above Michigan Admin. Code R. 57 criteria. A summary of constituents detected in monitoring well samples may be found in Table 28 of the RI.

In the unconsolidated aquifer, U.S. EPA detected several organic and inorganic constituents; two constituents, 1,2-dibromo-3-chloropropane and antimony, were detected at levels above the MCL, in one well each. In the bedrock aquifer, U.S. EPA detected a number of organic and inorganic constituents above background levels. Vinyl chloride was detected at the MCL in one well and detected at one additional well.

The only constituent which exceeded MCLs in the bedrock aquifer was arsenic. Arsenic exceeded the MCL at one shallow bedrock well, with a high of 126 ug/l and was detected at lower levels in 27 additional wells installed in the unconsolidated sediments and the shallow bedrock. This pattern of contamination indicates

that the elevated arsenic levels are caused by the landfill (Figure 4).

As described in the RI report for the site, U.S. EPA attributes the occurrence of arsenic in groundwater at the site both to release of arsenic from landfill wastes and to release from the Marshall Formation bedrock beneath the site. U.S. EPA found arsenic in samples of landfill wastes, but the concentrations were not significantly higher than that found in background subsurface soils near the site. However, during test pitting, the MDNR found wastes containing up to 2.7 mg/kg arsenic in deteriorated drums at Test Pit Area No. 9. These wastes and other unknown buried wastes could be a source of arsenic contamination in groundwater downgradient of the site.

U.S. EPA attributes arsenic in groundwater at the site mainly to release of arsenic naturally present in the Marshall Sandstone beneath the site and possibly from the glacial sediments (Saginaw lobe sands) overlying the bedrock. Borings into the Marshall Sandstone beneath the site show that in addition to sandstone, it contains coal, shale, and pyrite (commonly associated with arsenopyrite), all of which can contain arsenic. These natural sources of arsenic are present in the Marshall Sandstone in other areas as well, and release small amounts of arsenic to groundwater under natural conditions. The median arsenic concentration in groundwater from the Marshall Sandstone regionally is 2 ug/l. Wells immediately upgradient of this site contain up to 1.4 ug/l arsenic. Regionally, the sandy soil of the Saginaw glacial lobe which overlies the bedrock at this site contains an average of 2.6 mg/kg arsenic and may be an additional source of arsenic in groundwater at this site.

Assuming relatively uniform physical properties of the soil and bedrock, the primary factors affecting release of arsenic from bedrock or unconsolidated sediments are the geochemical conditions measured by pH (acidity) and Eh (oxidation-reduction potential, discussed below). These factors have been studied extensively in relation to arsenic release to groundwater. As cited in Section 4 of the RI Report, studies show that arsenic is released to groundwater when pH is high (greater than 8.0) or when Eh is low (under reducing conditions). ("Eh" is a measure of oxidation-reduction potential. Reduction is a chemical reaction in which an atom or molecule gains electrons, a process which is enhanced by the absence of oxidants like oxygen.)

U.S. EPA's investigation showed that only one groundwater sample at the site had a pH greater than 8, so pH is not the major factor controlling arsenic release at this site. In contrast, the monitoring wells in the arsenic plume showed low Eh or reducing conditions (as indicated by the presence of ammonia), while those upgradient of the landfill and outside of the arsenic plume showed higher Eh or oxidizing conditions.

As is common at uncapped landfills, water percolating through landfill wastes at this site becomes reduced by the chemical and biological degradation on-going in the landfill. As this reducing groundwater moves through the rock beneath the landfill, it causes the rock to release arsenic into solution. As the groundwater flows farther away from the landfill, the effect of the landfill is lessened and the water becomes more oxidized. The monitoring wells farthest from the landfill showed more oxidized conditions and very low arsenic concentrations. That result is consistent with the hypothesis that groundwater has reached its natural level of oxidation and arsenic concentrations have dropped to naturally occurring background levels by the time it reaches the residential wells farther down-gradient.

#### **4. Surface Soils**

A table summarizing constituents detected in surface soils may be found in Table 26 of the RI. Although background concentrations are typically established for naturally-occurring compounds only, historical industrial and agricultural activities near this site resulted in background occurrences of organic compounds as well. Compounds detected above background on the surface of the landfill include two volatile organic compounds (acetone and xylene) and numerous inorganics, including lead at 160 mg/kg, chromium at 63 mg/kg and arsenic at 52 mg/kg.

In surface soils adjacent to the landfill, several semi-volatile organic compounds and inorganic constituents were detected at levels slightly above background. These include lead at 78 mg/kg, chromium at 21 mg/kg and arsenic at 11 mg/kg.

#### **5. Surface Water and Sediments**

A summary of surface water detections from the North Branch of the Kalamazoo River is presented in Table 41 of the RI. No organic compounds were present at levels exceeding their respective background levels and federal water quality standards. The chromium concentration in one filtered river water sample exceeded both the background concentration and the federal water quality standard; however the detection is questionable since the corresponding unfiltered sample did not contain any detectable quantity of chromium.

Results of a groundwater loading model show that contaminants detected in groundwater near the river will not result in surface water concentrations above State of Michigan or Federal surface water criteria.

**E. SUMMARY OF SITE RISKS** (See Glossary for definitions of terms used in this section)

When it established a presumptive remedy for containment of municipal landfills, U.S. EPA was reacting to past experience that the heterogeneity and volume of these landfill wastes generally make treatment impracticable and capping essential. (See Presumptive Remedy for CERCLA Municipal Landfill Sites, OSWER Directive 9355.0-49FS, September 1993.) The Albion-Sheridan Township Landfill contains municipal waste and a wide variety of industrial wastes, for which protection against direct contact is essential for human health. Local government records and other documents indicate that the landfill accepted metal plating sludges, paint wastes and thinners, oil and grease, and dust, sand, and dirt containing fly ash and casting sand, in addition to other industrial wastes. Because of the known danger of direct contact, ingestion, and inhalation of these wastes, the presumptive remedy risk assessment assumes that the landfill will be properly capped and restricted from public access. Therefore, pursuant to this guidance, no risk assessment was performed for the landfill source itself, since any risk will be reduced to acceptable levels through proper capping (see OSWER Directive 9355.0-49FS, cited above).

Following the presumptive remedy guidance for municipal landfills, a numerical risk assessment was performed only for off-site media at the Albion-Sheridan Township Landfill Site, i.e., groundwater, off-site soils, surface water and sediments. The risk assessment is documented in the Presumptive Remedy Baseline Risk Assessment Report ("Risk Assessment Report"), which is found in the Administrative Record. The risk assessment determines actual or potential carcinogenic risks and/or toxic effects the chemical contaminants at the site pose using a four step process. The four step process includes: contaminant identification, exposure assessment, risk characterization, and health effects assessment. As explained below, many contaminants were identified as potential contaminants of concern at this site and subjected to a numerical risk analysis, but only a few, principally arsenic, were found to cause unacceptable risks to human health or the environment.

**1. Contaminant Identification**

The levels of contamination found in different media at the Site can be found in Section 4 of the RI Report. Chemicals of potential concern are generally selected for numerical risk analysis based on their toxicities, level of concentration and wide spread occurrence. At the Albion-Sheridan Township Landfill Site, risk calculations were also done for contaminants found at elevated levels at isolated locations and not widespread. The chemicals of potential concern are listed below in **Table 1** and discussed in Section 3 of the Risk Assessment Report.

For groundwater, 18 chemicals of potential concern (including arsenic) were identified for detailed risk analysis, including all of those which exceeded MCLs or Michigan Admin. Code R. 299.5709 (Act 307 Type B) health based levels and background levels. For off-site soils, 19 chemicals of potential concern (including arsenic), were identified which exceeded background soil levels. For residential wells, 2 chemicals of potential concern were identified (heptachlor and selenium). Three chemicals of potential concern were identified for surface water (carbon disulfide and two phthalate compounds). The Risk Assessment identified 22 chemicals of potential concern in river or wetland sediments (including arsenic).

## **2. Exposure Assessment**

The risk assessment examined potential off-site pathways of concern to human health for the area surrounding the immediate site property. Because the area land use is expected to remain mixed, current and future land-use scenarios were considered to be the same.

The following major pathways were selected for detailed evaluation:

- Ingestion and dermal contact with chemicals in groundwater;
- Incidental ingestion and dermal contact with chemicals in off-site surface soils;
- Incidental ingestion of and dermal contact with chemicals in surface water;
- Incidental ingestion and dermal contact with sediments.

## **3. Risk Characterization** (see glossary for a discussion of risk terms used in this section)

For each potential human receptor, site-specific contaminants from all relevant routes of exposure were evaluated. Both non-carcinogenic health effects and carcinogenic risks were estimated. As discussed below, non-carcinogenic health effects exceed a hazard index of 1.0 for arsenic, and to a lesser degree, thallium and antimony. Carcinogenic risk exceeds U.S. EPA's risk range for arsenic and to a lesser degree, 1,2-dibromo-3-chloropropane.

### **a. Non-Carcinogenic Health Risks**

The hazard index for humans interacting with the Site exceed the acceptable hazard index of 1.0, as shown in Table 2. For ingestion and dermal contact with the groundwater from the

shallow bedrock near the landfill, the hazard index values are approximately 12 for adults and 54 for children, principally because of the concentration of arsenic, and to a lesser amount, thallium and antimony. The hazard index for shallow bedrock for arsenic alone also significantly exceeds 1. Thallium was detected in only two groundwater samples, both at a concentration below the MCL. Antimony was detected twice at one location, both times at levels slightly above the detection limit and above the MCL. Analysis of a duplicate of one sample did not confirm the occurrence of antimony. Because their occurrence is extremely limited and, in the case of thallium, is below the MCL, U.S. EPA does not think the site poses unacceptable health risks from thallium and antimony.

All other off-site pathways resulted in hazard indices less than 1, as summarized in Table 2.

As discussed above, the risk of contact with the current landfill surface was not quantified because of the use of the presumptive remedy pursuant to OSWER Directive 9355.0-49FS, cited above. However, U.S. EPA expects that the hazard index for human contact with wastes present in the landfill could exceed 1, especially if wastes such as those sampled by the MDNR in 1980 (see Section B of this ROD) were exposed.

#### **b. Carcinogenic Health Risks**

The potential excess lifetime cancer risk posed by the Site exceeds the acceptable risk range of  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$  for carcinogens from the future use of contaminated groundwater near the landfill. Ingestion and dermal contact with groundwater from the unconsolidated sediments and shallow bedrock aquifer in this area present total carcinogenic risks in the range of  $2.4 \times 10^{-4}$  to  $2.1 \times 10^{-3}$ . The concentration of arsenic in the shallow bedrock aquifer and 1,2-dibromo-3-chloropropane in one sample of the unconsolidated sediment aquifer result in an exceedance of the one-in-ten thousand risk level. It should be noted that 1,2-dibromo-3-chloropropane was only detected in one sample. Natural oxidation of the contaminated groundwater in the shallow portion of the aquifer is expected to reduce the excess cancer risk from exposure to arsenic in the groundwater to a level below the MCL (see discussion in Section G of this ROD).

All other off-site pathways resulted in carcinogenic risks within or below U.S. EPA's acceptable risk range (Table 2).

The carcinogenic risk of contact with the current landfill surface was not quantified pursuant to the presumptive remedy guidance on municipal landfills. However, as with non-carcinogenic risk from the landfill, U.S. EPA expects that carcinogenic risks from contact with landfill wastes could also exceed the acceptable risk range of  $10^{-4}$  to  $10^{-6}$ .

### **c. Environmental Risks**

U.S. EPA conducted a preliminary ecological risk assessment to characterize the biological resources at the Site and adjacent habitats, and identify actual and potential impacts to these resources associated with releases of hazardous substances from the Site. While several contaminants were detected sporadically at low concentrations in the wetland and river surface water and sediment, the data suggest that the Albion-Sheridan Township Landfill is not currently a source of any significant effect on ecological receptors. The ecological risk assessment is found in Appendix C of the Risk Assessment.

## **4. Human Health Effects of Arsenic Ingestion**

The information presented here is from the Agency for Toxic Substances and Disease Registry (ATSDR) Document No. TP-92/02 "Toxicological Profile for Arsenic", April 1993, which is part of the Administrative Record for this site. Only ingestion effects of arsenic are summarized below, as this is the pathway most applicable to this site. This discussion also emphasizes doses of arsenic at concentrations similar to those present at this site.

### **a. Non-carcinogenic effects**

Long-term ingestion of low levels of arsenic may cause cardiovascular, gastrointestinal, hematological, hepatic (liver), dermal, and neurological effects. These may include irritation of stomach and intestines, decreased production of red and white blood cells, abnormal heart rhythm, blood-vessel damage, and impaired nerve function.

The single most characteristic effect of long-term exposure to arsenic is a pattern of skin changes, including a darkening of the skin and the appearance of small corns or warts on the palms, soles and torso. While these skin changes are not considered to be a health concern in their own right, a small number of the corns ultimately may develop into skin cancer.

For non-carcinogenic effects, the ATSDR estimates the lowest observed adverse effect level (LOAEL) for chronic ingestion of arsenic as about 0.014 mg/kg/day, which roughly corresponds to a groundwater concentration of 0.11 to 0.51 mg/l arsenic, depending on body weight. The highest concentration of arsenic at this site is 0.126 mg/l, which is within this range.

### **b. Carcinogenic effects**

The ATSDR reports a large number of studies showing that ingestion of arsenic increases the risk of developing skin cancer, most commonly squamous cell carcinomas which appear to

develop from the warts or corns described above. Ingestion of arsenic has also been reported to increase the risk of cancer in the liver, bladder, kidneys and lungs. U.S. EPA classifies arsenic as a human carcinogen.

The ATSDR reports that the lowest long-term dose of arsenic known to cause human cancer is about 0.009 mg/kg/day, which roughly corresponds to a groundwater concentration of 0.10 to 0.82 mg/l arsenic, depending on body weight. The highest concentration of arsenic seen at this site is 0.126 mg/l, which is within this range.

#### **F. RATIONALE FOR ACTION AND SCOPE OF THE SELECTED REMEDY**

For purposes of selecting alternatives to remedy site contamination, U.S. EPA divided the site into a number of "areas of concern." While these areas of concern are not separate operable units, the components of the selected alternatives correspond to addressing each threat posed by an area of concern. These areas of concern include drums, landfill cover, landfill gas and groundwater. An alternative remedial component was selected for each area of concern, as discussed below.

This ROD establishes the final remedy for the Site. The principal threat at the site is an area of drummed hazardous and liquid wastes and other potentially hazardous wastes in the landfill. The selected remedial alternatives will address this principal threat at the site.

#### **G. DESCRIPTION OF ALTERNATIVES**

The Albion-Sheridan Township Landfill was divided into four areas of concern: hazardous and liquid waste drums within the landfill, current landfill cover, landfill gasses, and groundwater contamination. Alternatives were developed independently for each of these areas of concern, as summarized below. A detailed description of the alternatives can be found in Sections 4 and 5 of the Feasibility Study report, which is in the Administrative Record.

#### **NO ACTION OPTION**

##### **Alternative 1 - No Action**

The No Action alternative serves as a basis to which all other alternatives are compared. Under this remedial alternative, no active remedial action or institutional action would be taken regarding the site.

Capital Cost: \$ 0  
Operation and Maintenance (O&M) Cost: \$0  
Present Value: \$ 0  
Timeframe: -0-

#### **DRUM REMOVAL OPTION**

**Alternative 2** - Removal and off-site disposal of hazardous and liquid waste drums

This option includes excavation of intact drums found to contain waste at the location designated TP-9 by the MDNR and excavation of other intact drums encountered during construction of the cap. MDNR estimates that 200 to 400 drums are present at TP-9, but some are empty. After characterization, those solid wastes found to contain organic and/or inorganic constituents in concentrations exceeding land disposal restrictions, or constituents for which incineration or stabilization as a treatment method is prescribed, will be transported to off-site facilities for treatment. All liquid wastes will be transported to off-site facilities for treatment and/or disposal. The off-site facilities will be in compliance with U.S. EPA's Off-Site Rule. Those drums containing solid wastes which do not trigger land disposal restrictions will be incorporated under the landfill cap, as the anticipated volume and concentration are not expected to significantly affect groundwater quality. The option would be implemented concurrently with cap construction.

Capital Cost: \$ 614,581  
O&M Cost: \$ 0  
Present Value: \$ 614,581  
Timeframe: 6 months

#### **LANDFILL CAP OPTIONS**

**Alternative 3A** - Containment by clay Solid Waste cap; deed restrictions

This clay cap alternative provides the minimum capping requirements in the State of Michigan for existing or pre-existing Type II landfills that do not contain a flexible membrane liner (Michigan Admin. Code R. 299.4425(3) (Act 641)). The existing landfill surface would be regraded. A 24-inch compacted clay infiltration barrier (hydraulic conductivity less than or equal to  $1 \times 10^{-7}$  cm/sec) would be installed over a granular gas collection layer. A 6-inch topsoil layer would be placed over the clay to support vegetation, stabilize the cap, and minimize erosion. This alternative also includes deed restrictions for landfill property and fencing of the landfill.

Capital Cost: \$ 1,542,609  
O&M Cost (30 yr): \$ 109,373  
Present Value: \$ 1,651,982  
Timeframe: 6 months

**Alternative 3B** - Containment by enhanced clay Solid Waste cap; deed restrictions

This clay cap enhances the minimum Act 641 requirements by providing additional frost protection for the clay infiltration layer. This would be accomplished by installing a 6-inch sand drainage layer between the 24-inch clay layer and the topsoil and by specifying a clay soil with a hydraulic conductivity of less than or equal to  $5 \times 10^{-8}$  cm/sec. This alternative also includes regrading, deed restrictions, and fencing, identical to Alternative 3A.

Capital Cost: \$ 1,779,137  
O&M Cost (30 yr): \$ 109,373  
Present Value: \$ 1,888,510  
Timeframe: 6 months

**Alternative 3C** - Containment by flexible membrane liner Solid Waste cap; deed restrictions

This alternative is an equivalent cover system in accordance with Michigan Admin. Code R. 299.4425(5) (Act 641). This alternative uses a flexible membrane liner (FML) instead of clay soil as the infiltration barrier material. An FML of 40 mil low density polyethylene or 30 mil polyvinyl chloride would be placed over a 12-inch granular gas collection layer. Eighteen inches of cover soil would be placed over the FML to protect against puncture and ultraviolet rays. A 6-inch drainage layer would be placed over the cover soil, with 6 inches of topsoil placed over the drainage layer to support vegetation and to stabilize the cap by minimizing erosion. This alternative also includes regrading, deed restrictions, and fencing, identical to Alternative 3A.

Capital Cost: \$ 1,728,431  
O&M Cost (30 yr): \$ 109,373  
Present Value: \$ 1,837,804  
Timeframe: 6 months

#### **LANDFILL GAS OPTIONS**

**Alternative 4A** - Passive collection and venting of landfill gas

Under this alternative, a passive gas collection system would be constructed to control off-site migration of landfill gas. Venting wells would be constructed across the landfill to vent landfill gas to the atmosphere. Approximately 16 vent wells would be drilled the entire depth of the solid waste fill,

estimated at an average of 20 feet, and spaced approximately every 200 feet. This alternative would be constructed concurrently with the landfill cap.

Capital Cost: \$ 49,600  
 O&M Cost (30 yr): \$ 207,777  
 Present Value: \$ 257,377  
 Timeframe: 6 months

**Alternative 4B - Active collection and flaring of landfill gas**

This alternative includes construction of an active gas collection system to control emission of landfill gas from the site. The collected landfill gas would be treated on-site by flaring prior to discharge to the atmosphere. The alternative includes construction of approximately 16 gas wells similar to the wells in the passive venting system, piping, and a blower/flare facility. This alternative would be constructed concurrently with the landfill cap.

Capital Cost: \$ 182,900  
 O&M Cost (30 yr): \$ 446,093  
 Present Value: \$ 628,993  
 Timeframe: 6 months

**GROUNDWATER OPTIONS**

**Alternative 5A - Groundwater monitoring; institutional controls**

This alternative includes the installation of four new monitoring wells and the monitoring of existing monitoring wells and residential wells near the landfill on a quarterly to annual basis for arsenic and other contaminants. Groundwater monitoring would allow U.S. EPA to evaluate the contaminant plume's migration rate and direction, and to monitor the fate of contaminants, primarily arsenic. This alternative will allow evaluation of the effectiveness of the landfill cap for reducing arsenic in the groundwater. U.S. EPA expects this alternative to take 1 to 2 months to construct. U.S. EPA expects arsenic to decrease to 0.05 mg/l throughout the contaminant plume within 15 years. This alternative includes 5 years of monitoring beyond that time to ensure that the MCLs continue to be met. This alternative also includes institutional controls in the form of deed restrictions or local ordinances to prohibit the construction of drinking water wells which draw water from the contaminant plume, until the plume meets MCLs.

Capital Cost: \$ 128,822  
 O&M Cost: \$ 642,335  
 Present Value: \$ 771,157  
 Timeframe: 20 years

**Alternative 5B** - In-situ treatment of arsenic in groundwater to 0.05 mg/l (the MCL); groundwater monitoring; institutional controls

Under this alternative, groundwater would be treated by in-situ oxidation to remove arsenic from solution. There would be only one clean-up standard, which would be 0.05 mg/l (the MCL) for arsenic. The in-situ groundwater treatment system would consist of a network of wells designed to inject air or another oxidant so as to treat the entire contaminant plume that exceeds 0.05 mg/l arsenic. The treatment system would be operated until groundwater meets the clean-up standard for arsenic at the landfill boundary and throughout the contaminant plume. Groundwater monitoring under this alternative would be used to evaluate the progress of groundwater remediation and to verify that impacted groundwater does not migrate beyond the range of influence of the treatment system. U.S. EPA expects this alternative to take 3 months to construct and 5 years to reach the clean-up standard. This alternative includes 5 years of monitoring after the clean-up standard is reached to ensure that the standard continues to be met and institutional controls identical to Alternative 5A.

Capital Cost: \$ 560,284  
O&M Cost: \$ 790,457  
Present Value: \$ 1,350,741  
Timeframe: 10 years

**Alternative 5C** - In-situ treatment of arsenic in groundwater to 0.002 mg/l (regional background); groundwater monitoring; institutional controls

This alternative is identical to Alternative 5B except that the clean-up standard would be 0.002 mg/l arsenic and the treatment system would be designed to encompass that portion of the contaminant plume that exceeds 0.002 mg/l arsenic. The treatment system would be operated until groundwater meets the clean-up standard for arsenic at the landfill boundary and throughout the contaminant plume. U.S. EPA expects this alternative to take 3 months to construct and 12 years to reach the clean-up standard. This alternative includes 5 years of monitoring after the clean-up standard is reached to ensure that the standard continues to be met and institutional controls identical to Alternative 5A.

Capital Cost: \$862,656  
O&M Cost: \$ 1,539,827  
Present Value: \$ 2,402,483  
Timeframe: 17 years

**Alternative 5D** - Groundwater extraction and above-ground treatment of arsenic to 0.002 mg/l arsenic (regional background); groundwater monitoring; institutional controls

This alternative includes installation of a groundwater extraction system of approximately 3 wells to intercept the contaminant plume where it exceeds 0.002 mg/l arsenic and construction of an above-ground treatment system to treat arsenic. The alternative would involve pilot testing a treatment system using a chemical oxidation, coagulation, and filtration or sedimentation treatment train. Treated groundwater would be disposed on-site into the North Branch of the Kalamazoo River or off-site to the City of Albion sewage treatment plant. U.S. EPA expects this alternative to take 6 months to construct and 9 years to reach the clean-up standard. This alternative includes 5 years of monitoring after the clean-up standard is reached to ensure that the standard continues to be met and institutional controls identical to Alternative 5A.

Capital Cost: \$ 931,703  
 O&M Cost: \$ 1,280,281  
 Present Value: \$ 2,211,984  
 Timeframe: 14 years

#### **H. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES**

The relative performance of each remedial alternative was evaluated in the FS and is summarized below using the nine criteria set forth in the NCP at 40 C.F.R. §300.430. As described in this section of the NCP, the nine criteria are divided into threshold criteria, primary balancing criteria and modifying criteria. **Table 4** summarizes the comparative analysis. An alternative and a contingent alternative providing the "best balance" of trade-offs with respect to the nine criteria are determined from this evaluation.

##### **THRESHOLD CRITERIA**

The following two threshold criteria, overall protection of human health and the environment, and compliance with Applicable or Relevant and Appropriate Requirements (ARARs) are criteria that must be met in order for an alternative to be selected.

##### **1. Overall Protection of Human Health and the Environment**

Overall protection of human health and the environment addresses whether a remedy eliminates, reduces, or controls threats to human health and to the environment.

No-action Option: Alternative 1 does not satisfy the requirement for overall protection of human health and the environment.

Drum Disposal Option: Alternative 2 provides protection to human health and the environment by reducing the risk of hazardous and liquid wastes leaching into the groundwater. This will not

eliminate the risk because additional wastes will remain at the site.

Landfill Cap Options: With each of the landfill cap alternatives, the human health risk associated with exposure to the wastes in the landfill is eliminated. Additionally, each capping alternative reduces the risk associated with release of the leachate into the groundwater or outside the landfill boundaries. However, Alternative 3A may not satisfy the requirement for overall protection of human health and the environment because it is susceptible to damage from freeze-thaw cycles and may allow continued infiltration of water through the landfill wastes. Alternative 3B is more effective than Alternative 3A because it would likely continue to have a lower permeability even after freeze-thaw cycles. Alternative 3C provides protection because it is not susceptible to frost cracking and it is more effective in reducing infiltration of water through the landfill, thus reducing the amount of contaminants that can potentially enter the groundwater.

Landfill Gas Options: Both landfill gas options would protect the landfill containment system from adverse pressure buildup beneath the cap and will prevent migration of landfill gas laterally off-site. However, Alternative 4A does not provide for treatment of the landfill gas and so may not be protective of human health if the gas generation rate or concentrations are high or if certain types of gases are produced. Alternative 4B provides protection by treating the landfill gas by flaring. However, if design studies show that the gas generation rate is low or if the generation rate is found to be low following capping, Alternative 4A may also be protective.

Groundwater Options: All of the groundwater options provide for overall protection of human health and the environment by natural removal or treatment of arsenic and by limiting human consumption of contaminated groundwater through institutional controls. Alternative 5A provides protection by monitoring groundwater to confirm that arsenic is being removed from the groundwater through natural oxidation as expected and that the arsenic will not migrate to locations where it may impact residential wells. However, if arsenic is not removed from the groundwater naturally, Alternative 5A may not be protective if used alone. Alternative 5B provides additional protection for human health by treating groundwater to the MCL, which is inherently protective of human health. Alternative 5C and 5D each provide protection by treating arsenic to the regional background level, which is below a  $1 \times 10^{-6}$  risk level.

## 2. Compliance with ARARs

This criterion evaluates whether an alternative meets ARARs set forth in federal, or more stringent state, environmental standards pertaining to the Site or to proposed actions.

Because the No Action alternative does not involve conducting any remedial action at the Site, no ARARs analysis is necessary for Alternative 1. With the exception of landfill gas alternative 4A, all of the remaining alternatives (2, 3A, 3B, 3C, 4B, 5A, 5B, 5C, and 5D) are expected to be in compliance with action, chemical, and location specific ARARs as shown in Tables 2.1a through 2.6b of the FS Report and discussed in Section J(2) below.

Alternative 4A may not be in compliance with Michigan Admin. Code R. 433 (Act 641) regarding landfill construction or Michigan Comp. Laws Section 348 regarding air emissions if (1) the methane gas generated by the landfill exceeds 25% of the lower explosive limit for methane in the landfill, exclusive of gas control components or (2) the methane gas generated by the landfill exceeds the lower explosive limit at or beyond the facility property boundary or (3) if any gasses generated by the landfill create a nuisance or are otherwise in violation of Michigan Comp. Laws Section 348 at the property boundary.

## PRIMARY BALANCING CRITERIA

### 3. Long-Term Effectiveness and Permanence

This criterion refers to expected residual risk and the ability of an alternative to maintain reliable protection of human health and the environment over time once clean up levels have been met.

No-Action Option: Alternative 1 provides no long-term effectiveness and would result in continuation of the elevated risk levels that currently exist at the Site.

Drum Disposal Option: Alternative 2 meets the criteria of long-term effectiveness and permanence. There is some residual risk from this alternative due to residues from off-site incineration and stabilization processes used to treat the drummed waste. These residues would be disposed in licensed land disposal facilities which will have engineering controls in place to ensure adequate long-term containment of the wastes. There is also residual risk from additional wastes remaining in the landfill.

Landfill Cap Options: Alternatives 3A, 3B and 3C all provide some degree of long-term effectiveness and permanence through containment of the waste and reduction of infiltration and by implementing institutional controls to maintain the cap's

integrity. Each of the three caps will reduce ingestion, inhalation, and direct contact with contaminated materials and will reduce infiltration of precipitation into the waste mass which reduces leachate generation. Alternative 3B is expected to be more effective and permanent than Alternative 3A because it includes a clay layer with lower permeability to provide some frost protection and a sand layer to provide drainage. Alternative 3C is expected to be the most effective and permanent because it includes both a sand layer for drainage and a flexible membrane liner which is not susceptible to frost-cracking.

Landfill Gas Options: Alternatives 4A and 4B both provide some degree of long-term effectiveness and permanence by preventing long-term migration of landfill gases laterally off-site and protecting the landfill cap from adverse pressure buildup. Alternative 4B presents less residual risk in that it includes treatment of gases by flaring, rather than releasing gases to disburse untreated.

Groundwater Options: All of the groundwater alternatives are expected to provide long-term effectiveness and permanence. At completion, groundwater throughout the contaminant plume is expected to have arsenic concentrations below the MCL (0.05 mg/l) for Alternative 5A and 5B. Residual risk immediately following Alternative 5C or 5D would be lower than Alternative 5A or 5B because 5C and 5D involve treatment to a lower level. However, if Alternative 5A or 5B is implemented, U.S. EPA expects the arsenic to continue to decrease below the MCL with time. Groundwater monitoring is planned to continue for 5 years beyond attainment of the treatment standard in each alternative.

If Alternative 5A is effective in the short term, it is likely to be the most effective alternative in the long-term because it involves monitoring a natural clean-up process (natural oxidation) to remove arsenic from groundwater. U.S. EPA expects arsenic to precipitate and otherwise be removed from groundwater as conditions in the contaminant plume become more oxidizing (e.g., contain more oxygen) after the landfill is capped. The landfill cap in Alternative 3C would be the most effective in changing groundwater conditions because it is the most effective in the long-term at reducing infiltration through the landfill. The Agency also expects an oxidizing environment to reduce the release of arsenic from the bedrock formation into the groundwater.

#### **4. Reduction of Toxicity, Mobility, or Volume through Treatment**

This criterion evaluates treatment technology performance in the reduction of chemical toxicity, mobility, or volume. This criterion addresses the statutory preference for selecting remedial actions which include, as a principal element, treatment

that permanently and significantly reduces the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants.

No-Action Option: Alternative 1 for "no-action", provides no reduction in toxicity, mobility, or volume.

Drums and Landfill Options: Alternative 2 for drum extraction and treatment provides a reduction in toxicity, mobility and volume through off-site incineration or stabilization of hazardous and liquid wastes found in drums. Although there will be no additional treatment of landfill contents, landfill cap alternatives 3A, 3B and 3C all provide a reduction in mobility of hazardous substances by reducing leachate generation in the landfill, although 3C would be the most effective in this. Alternative 4A reduces the mobility of landfill gas by controlling lateral migration and 4B reduces volume, toxicity and mobility of the gases by gas collection and treatment.

Groundwater Options: Alternative 5A for groundwater monitoring does not include treatment as a direct action. However, under this alternative, U.S. EPA expects reduction of toxicity and mobility to be achieved through natural oxidative processes in the aquifer. Alternatives 5B, 5C, and 5D meet this requirement more fully by achieving faster reduction of toxicity and mobility by in-situ groundwater treatment or by collection and above-ground treatment.

## **5. Short-Term Effectiveness**

Short-term effectiveness considers the time to reach cleanup objectives and the risks an alternative may pose to site workers, the community, and the environment during remedy implementation until cleanup standards are achieved.

Drums and Landfill Options: Potential risks to the community from excavating drums, capping the landfill and constructing a landfill gas control system (Alternatives 2, 3A, 3B, 3C, 4A and 4B) are from exposure to airborne dust and organic vapors from the waste mass and leachate. The risk to the community from exposure to organic vapor is approximately equal for the three cap options. The FML cap (Alternative 3C) may pose less total risk to the community during construction than the clay caps (Alternatives 3A and 3B) due to less truck traffic and less exposure to airborne dust. The risk to workers employed in the construction of any of the cap options and either of the gas collection systems from exposure to the waste mass and leachate material is approximately equal. All the alternatives, except Alternative 1 for "no-action", include measures to minimize the short-term impacts during construction, such as dust control and the use of safe work practices.

Groundwater Options: U.S. EPA expects the natural oxidation processes monitored by Alternative 5A for groundwater monitoring to reduce arsenic in groundwater to 0.05 mg/l (the MCL) within 15 years. Alternative 5B reduces the time to reach the MCL to 4 years by treating the water in-situ. The more stringent clean-up standard of 0.002 mg/l set in Alternative 5C and 5D would take 12 years and 9 years to reach, respectively.

There is some uncertainty about how fast the natural oxidation process will reduce arsenic in groundwater. Alternative 5B and 5C reduce this uncertainty by treating the groundwater in-situ to enhance oxidation. Alternative 5D reduces this uncertainty by groundwater extraction and above-ground treatment. However, because most of the impacted groundwater is located in the fractured bedrock aquifer, there remains some uncertainty regarding the effectiveness of the in-situ treatment of Alternatives 5B and 5C and of the groundwater extraction system in Alternative 5D.

## 6. Implementability

This criterion addresses the technical and administrative feasibility of implementing an alternative, and the availability of various services and materials required for its implementation.

All the alternatives are implementable and can be readily constructed with technology and materials presently available. Construction of the FML cap, Alternative 3C, is slightly more difficult to implement than Alternative 3A or 3B because its effective installation involves more specialized testing to ensure an effective seal.

All of the groundwater monitoring and treatment alternatives depend on proven and readily available equipment and expertise. Alternative 5A for groundwater monitoring is the most easily implementable, compared to the other groundwater alternatives, since it relies in large part on existing wells.

## 7. Cost

This criterion compares the capital, O&M, and present value costs of implementing the alternatives at the Site. **Table 3** shows the Cost Summary. The "no-action" option is the least costly, but does not protect human health or the environment. The clay landfill cap considered under Alternative 3A is slightly less costly than the caps considered under Alternatives 3B and 3C. The enhanced clay cap in Alternative 3B is slightly more expensive than the FML cap in Alternative 3C. Passive venting under Alternative 4B is substantially less costly than active gas collection and treatment in Alternative 4A. Of the groundwater alternatives, Alternative 5A, groundwater monitoring, is the

least costly. Alternatives 5C and 5D, which involve treatment to more stringent levels, are more costly than Alternative 5B, which involves treatment to the MCL.

## MODIFYING CRITERIA

### 8. State Acceptance

The State of Michigan is in agreement with the selection of Alternative 2 for drum removal, Alternative 3C for the landfill cap, Alternative 4B for landfill gas (unless pre-design studies show that 4A meets ARARs), and Alternative 5A for groundwater, for remediation of the Albion-Sheridan Township Landfill Site. The State is also in agreement with the selection of Alternative 5B as a contingent remedy for groundwater clean-up. The State has provided U.S. EPA with a letter of concurrence.

### 9. Community Acceptance

Comments have been submitted by the community, local government officials, and potentially responsible parties (PRPs). Comments and responses to those comments are described in the Responsiveness Summary.

## I. THE SELECTED REMEDY

Based upon considerations of the requirements of CERCLA, the NCP and balancing of the nine criteria, the U.S. EPA has determined that Alternatives 2 for drum removal, 3C for a flexible membrane cap, 4B for active gas collection, and 5A for groundwater monitoring, with a contingency for Alternative 5B, in-situ treatment to the MCL, together constitute the most appropriate remedy for the Site. The components of the selected remedy are described below. Mitigative measures will be taken during all remedy construction activities to minimize adverse impacts to surrounding residents and the environment.

A review will be conducted within five years after commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment because this remedy will result in hazardous substances remaining on site above health-based levels.

### 1. Drum Removal

All drums found to contain solid or liquid wastes at the location designated TP-9 on **Figure 5** and which are structurally sound enough to remove with wastes intact will be excavated. The location and extent of area TP-9 are described further in the report "Technical Memorandum No. 1" prepared for the MDNR by ABB Environmental Services, Inc. This report is part of the

Administrative Record for this site. MDNR estimates that 200 to 400 drums are present in this area, some of which are empty. All other structurally sound drums containing solid or liquid wastes encountered during consolidation or site preparation for landfill cap construction will also be excavated. All excavated drums showing signs of degradation will be overpacked as necessary, and moved to a staging area for waste characterization. Approximately nine overpacked drums excavated by the MDNR during test pitting which are temporarily secured on the surface of the landfill will be included with other excavated drums for proper characterization and removal. After characterization, those solid wastes found to contain organic and/or inorganic constituents in concentrations exceeding land disposal restrictions, or constituents for which incineration or stabilization as a treatment method is prescribed, will be transported to off-site facilities for treatment. All liquid wastes will be transported to off-site facilities for treatment and/or disposal. The off-site facilities will be in compliance with U.S. EPA's Off-Site Rule. Those drums containing solid wastes which do not trigger land disposal restrictions will be incorporated under the landfill cap, as the anticipated volume and concentration are not expected to significantly affect groundwater quality.

Empty storage tanks and abandoned machinery located on the surface of the landfill will either be incorporated into the landfill or transported to off-site facilities for recycling or disposal. Any items removed off-site will be wipe sampled as appropriate to determine the proper type of disposal facility or its acceptability to a recycling facility.

## **2. Landfill Cap**

The entire landfill waste mass shown on Figure 1 will be capped. Site preparation and layout will be completed to re-route surface water drainage away from the capped area.

Waste on the east edge of the landfill will be consolidated towards the west so that the east boundary of the landfill cap and any perimeter road needed for maintenance is contained on Lot 28 (Figure 1). Waste on the south edge of the landfill will be consolidated so that the south boundary of the landfill cap and any perimeter road needed for maintenance is contained on Lot 28, parcel 3 and that portion of Lot 28, parcel 2 north of a line extending due east from the north boundary of parcel 1. If Lot 28, parcels 1 and 2 are instead acquired, consolidation of the south edge of the landfill will not be necessary. Any property acquisition will be done in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970.

The landfill will be graded to attain grades and slopes required to facilitate drainage. Regrading may be used to achieve sub-cap contours. Any materials other than clean fill employed to achieve proper contours will be used only if specifically approved by U.S. EPA, in consultation with MDNR. To the extent practicable, existing trees in areas not affected by the landfill cap will be left in place.

At a minimum, the cap will consist of a 12-inch sand gas collection layer on top of the existing waste mass, a flexible membrane liner (FML), a 6 inch sand drainage layer or technical equivalent, 18 inches of cover soil, and 6 inches of topsoil. A filter fabric may be placed between the cover soil and the drainage layer to minimize fill material from clogging the drainage layer. The FML will be equivalent to or less permeable than a 40 mil low density polyethylene or 30 mil polyvinyl chloride. The drainage layer will be composed of either 6 inches of sand no coarser than 3/8 inch, with a minimum hydraulic conductivity of  $1 \times 10^{-2}$  cm/sec, or a synthetic material with a transmissivity of at least  $3 \times 10^{-5}$  m<sup>2</sup>/sec.

The Presidential Memorandum on Environmentally and Economically Beneficial Practices, signed on April 26, 1994 and published in the Federal Register on August 22, 1994 (59 FR 43122), encourages Federal agencies to incorporate the use of native plants wherever practicable into landscape projects, in order to reduce the use of chemical fertilizers and pesticides, reduce water usage, reduce maintenance costs and preserve natural habitats. Therefore, pre-design studies will be performed to determine whether seeding the vegetative soil layer on the surface of this landfill with native species is practical and cost-effective, considering both short-term and long-term costs. If U.S. EPA determines that the use of native species is practical and results in the same or less cost in the long-term than the use of traditional species, native species will be used.

### **3. Landfill Gas**

Unless landfill gas characterization studies during the pre-design stage show that gas emissions will meet ARARs (e.g., Michigan Comp. Laws Section 641 and 348) without treatment, an active landfill gas collection system will be located in a grid network throughout the landfill and the off-gas from the landfill will be collected by piping and treated in a blower/flare facility. However, if U.S. EPA, in consultation with MDNR, determines that a passive venting system will meet ARARs, a system of venting wells may be constructed across the landfill to vent landfill gas to the atmosphere. The gas collection or venting wells will be constructed to collect gas from the entire area and depth of the landfill.

#### 4. Groundwater Monitoring

A groundwater monitoring program will be designed and implemented at the site. The monitoring program will include:

- (1) Quarterly sampling of the contaminant plume to detect changes in concentration of arsenic in the groundwater and to determine whether the levels of arsenic trigger the contingent remedy as specified below,
- (2) Quarterly sampling of drinking water wells downgradient of the Site and of the Amberton Village water wells, to detect the presence and concentration of any site-related contamination,
- (3) Annual sampling of the contaminant plume to detect additional hazardous constituents which may be present,
- (4) Annual sampling of the arsenic concentration for five years following attainment of the clean-up standard, to ensure that the standard continues to be met, and
- (5) Collection of a water level measurement whenever a well is sampled, to confirm groundwater flow directions at the site.

During the pre-design phase, four new monitoring wells will be installed to define further the contaminant plume to the west and south of the site and to define further the vertical extent of contamination, in order to design an effective groundwater monitoring program. The new wells will be installed at the approximate locations indicated in **Figure 6**: MW09DB in the deep bedrock, MW15SB in the shallow bedrock, MW16SB in the shallow bedrock, and MW16DB in the deep bedrock. The MW15SB well will be vertically sampled prior to installation to ensure that the most contaminated interval is screened. Also prior to the initiation of the groundwater monitoring program, the water levels of all existing and new monitoring wells will be recorded and all wells will be sampled and analyzed for target compound list (TCL) organics, target analyte list (TAL) inorganics, and 1,2-dibromo-3-chloropropane. These analyses will be done using methods which achieve method detection limits equal to or less than the MCL for each compound or analyte, for those which have an MCL.

#### 5. Contingent Remedy for In-Situ Groundwater Treatment

Five years from the date on which construction of the landfill cap is complete, a statistical test will be performed on wells in which the arsenic concentration exceeds 0.05 mg/l (currently only MW06SB). This statistical test, described below, is designed to determine whether arsenic in this well or wells is declining sufficiently fast to fall below 0.05 mg/l within 15 years of

completion of landfill cap construction. If any well fails this test, the contingent remedy will be implemented.

Implementation of the contingent remedy includes pilot testing, design, installation and operation of a system for in-situ oxidation of groundwater which will restore arsenic in groundwater to 0.05 mg/l (the MCL). This system for in-situ groundwater treatment will also be implemented if at any time U.S. EPA, in consultation with MDNR, determines that the groundwater plume affected by the landfill threatens to raise a residential well, in existence at the time this ROD is signed, above 0.05 mg/l, the MCL for arsenic.

#### **a. Description of the Contingent Remedy**

If the contingent remedy is implemented, the in-situ groundwater treatment system will first be pilot-tested to determine whether air or another oxidant is most suitable for the site and to assist with design of the system. The system will consist of a network of wells designed to treat all contaminated groundwater that exceeds the MCL for arsenic, for example as shown in **Figure 7**. The in-situ groundwater treatment system will be operated until groundwater meets the MCL for arsenic at the landfill boundary and throughout the contaminant plume.

U.S. EPA expects the precipitated arsenic from the in-situ treatment to be in the form of a suspended solid, which will be removed from groundwater as it flows through fractured bedrock and granular soils. Groundwater monitoring will be used to evaluate the progress of groundwater remediation and to verify that impacted groundwater does not migrate beyond the range of influence of the treatment system. Groundwater monitoring will continue for five years after the clean-up standard is reached to ensure that the standard continues to be met.

#### **b. Contingent Remedy Trigger**

If, five years after completion of the landfill cap, any well fails the statistical test described below, the contingent remedy will be implemented. For each well that exceeds 0.05 mg/l arsenic (currently only MW06SB), data collected over the five year period will be used to estimate the date at which arsenic concentrations will meet 0.05 mg/l. Initially, sample concentrations of arsenic will be plotted against time to enable U.S. EPA to determine if a downward trend is present. If, five years after completion of the landfill cap, U.S. EPA determines that a downward trend is present over a sufficient number of quarters, a regression, time series, or other model approved by U.S. EPA will be used to estimate arsenic concentrations based on time. If the data do not exhibit a serial correlation, a regression model will be used to estimate a linear or nonlinear trend for the subset of data which represent a downward trend.

If the data do exhibit a serial correlation, a time series model will be developed in lieu of a regression model on the same subset of data. Another method may be used if approved by U.S. EPA. For each well which exceeds 0.05 mg/l arsenic and has a downward trend for arsenic, the model approved for those data will be used to predict the date at which arsenic concentrations will meet 0.05 mg/l arsenic, assuming that the observed trend continues. A well fails the statistical test if the date at which the arsenic concentration is predicted to meet 0.05 mg/l is more than 15 years from the date of landfill cap completion.

#### **6. Institutional Controls**

Institutional controls will be implemented, which include access and deed restrictions and may include local ordinances. A fence around the entire landfill will control access to the site and protect the cap. A maintenance program will be implemented to maintain the landfill cap. This program will include maintaining a full, competent vegetative layer and periodic inspection of the cover to ensure that excessive erosion or leachate seeps are not occurring. Deed restriction to prevent future development of the landfill property will be implemented pursuant to Michigan Admin. Code R. 299.610(e). Deed restrictions or local ordinances may be implemented to restrict construction of water wells which will draw water from the arsenic plume as shown on Figure 4. At a minimum, advisories will be issued to all property owners impacted by the arsenic plume.

#### **J. DOCUMENTATION OF SIGNIFICANT CHANGES**

U.S. EPA released a Proposed Plan for public comment on October 3, 1994. The Proposed Plan identified the following remedy components for this Site: Alternative 2 for drum disposal, Alternative 3C for a landfill cap, Alternative 4B for gas collection, Alternative 5A for groundwater monitoring, and a contingent remedy for Alternative 5B for in-situ treatment of groundwater. This ROD makes no change in the Alternatives selected. However, based on comments received during the public comment period, this ROD allows a change in the order of the material layers of the selected landfill cap from that presented in the proposed plan. Also, this ROD specifies that as part of cap construction, waste must be consolidated away from a private residence adjacent to the landfill. This was not addressed in the Proposed Plan. Both of these issues are discussed more fully in the Responsiveness Summary.

#### **K. STATUTORY DETERMINATIONS**

U.S. EPA's primary responsibility at Superfund Sites is to undertake remedial actions that protect human health and the

environment. Section 121 of CERCLA has established several statutory requirements and preferences. These include the requirement that the selected remedy, when completed, must comply with all ARARs imposed by Federal and State environmental laws, unless the invocation of a waiver is justified. The selected remedy must also provide overall effectiveness appropriate to its costs, and use permanent solutions and alternative treatment technologies, or resource recovery technologies, to the maximum extent practicable. Finally, the statute establishes a preference for remedies which employ treatment that significantly reduces the toxicity, mobility or volume of contaminants. The following sections discuss how the selected remedy and contingent remedy meet these statutory requirements.

### **1. Protection of Human Health and the Environment**

Implementation of the selected remedy and the contingent remedy will protect human health and the environment by reducing the risk of exposure to hazardous substances present in the landfill and groundwater at the Site. The excavation and off-site treatment of drummed hazardous and liquid wastes provides protection by reducing the risk of these wastes leaching into the groundwater and contaminating drinking water or mixing with surface water. The selected FML landfill cap will reduce the direct contact risk of exposure to hazardous substances present in soil at the Site. Additionally, the FML cap will reduce the rate of infiltration by which precipitation passes through the contaminated soil and will maintain that reduction over time. By reducing the rate of infiltration, the FML cap will also reduce the rate of leachate generation in the landfill; and therefore, it will also reduce the risk that hazardous substances, pollutants, and contaminants present in the leachate will migrate and contaminate the aquifer.

Groundwater monitoring will be required to provide early warning against the risk that arsenic present in the groundwater adjacent to the landfill may migrate and contaminate residential wells. If the contingent remedy for groundwater treatment is triggered, an in-situ groundwater treatment system will clean up groundwater at a faster pace to further protect drinking water supplies. Institutional controls will be imposed to restrict uses of the Site to prevent exposure to hazardous substances and contaminants in the soil and the groundwater at the Site. No unacceptable short-term risks will be caused by implementation of the remedy. The community and site workers may be exposed to dust and noise nuisances during construction of the landfill cap. Mitigative measures will be taken during remedy construction activities to minimize such impacts of construction upon the surrounding community and environs. Ambient air monitoring will be conducted and appropriate safety measures will be taken if contaminants are emitted.

## 2. Compliance with ARARs

The selected remedy and the contingent remedy will comply with all chemical, action, and location specific ARARs. For a complete list of ARARs and other criteria, advisories and guidance to be considered for the alternatives at this site, see Tables 2.1a through 2.7 of the Feasibility Study Report. Below is a discussion of the key ARARs for the selected remedy.

**KEY FEDERAL ARARs** (See Feasibility Study Report for complete listing of action, chemical and location specific ARARs.)

### 1. Action Specific

#### Resource Conservation and Recovery Act (RCRA)

RCRA requirements for facilities treating, storing or disposing of hazardous wastes (Subtitle C) are not applicable because the landfill was closed in 1981 and no available records indicate that wastes were disposed of after November 19, 1980, the effective date of RCRA. However, RCRA Subtitle C requirements are relevant and appropriate to the portion of the remedy involving off-site treatment of drummed waste because some of the drummed wastes are likely to have hazardous characteristics or contain constituents which are regulated as a "listed" hazardous waste under RCRA. These requirements are appropriate because they address the protection of the environment at the Site and at the off-site disposal location, which could be contaminated by these RCRA-like wastes. The drum disposal portion of the selected remedy and contingent remedy will meet these requirements.

RCRA Subtitle C requirements are also relevant to the landfill wastes which will be left at the site, but they are not appropriate. They are relevant because the landfill accepted hazardous industrial wastes, including metal plating sludges, and these wastes, which are similar to listed wastes, will remain buried at the site. RCRA Subtitle C requirements are not appropriate for the site, however, because of the low levels of contamination found during investigation of the landfill and off-site media.

As previously discussed, samples of landfill waste from borings contained numerous contaminants, the most concentrated of which was 4-Methyl phenol at 15 mg/kg. Several inorganic substances were present above background levels in subsurface soils, including antimony, arsenic, chromium, copper, lead, mercury, and zinc. The highest concentrations included lead at 208 mg/kg, arsenic at 13.1 mg/kg and chromium at 13.5 mg/kg. Additionally, sampling for characteristic wastes showed no such wastes present in the landfill. One sample was suitable for the TCLP metals analysis, the results of which indicated the presence of barium

and lead in the TCLP leachate, both below hazardous waste levels. Therefore, Subtitle C requirements do not correspond to the relatively low risks posed by the site. Subtitle D requirements are more appropriate to the site conditions.

RCRA Subtitle D regulates the disposal of solid waste. Subtitle D requirements are not applicable to the site, but are relevant and appropriate. 40 CFR Part 258 regulates municipal solid waste, which is a large part of the waste disposed at this site. This Part requires the use of a barrier layer consisting of two feet of clay, or a technical equivalent which will provide equal or greater protection against infiltration. The flexible membrane liner and other components of the cap required by this ROD are equivalent to or more protective than required by RCRA Subtitle D.

#### Clean Air Act (CAA)

The CAA establishes National Ambient Air Quality standards (NAAQS) for several "criteria pollutants" expressed as primary and secondary allowable short- and long-term concentrations in the air. Under the CAA, each state must adopt a state implementation plan to demonstrate how it will meet its statutory obligation to attain and maintain NAAQS. Standards called New Source Performance Standards (NSPS) are promulgated under the regulatory authority of the CAA. Title III applies to new sources which emit more than 10 tons per year of any hazardous air pollutant or 25 tons per year of any combination of hazardous air pollutant listed. Emissions at this Site are not expected to exceed these limits, but if they do, best available control technology requirements may be applicable. If this is the case, the selected remedy and contingent remedy will meet this requirement.

#### Occupational Safety and Health Act (OSHA)

Regulations promulgated under the Occupational Safety and Health Act, codified at 29 CFR 1910, regulate the safety and health of workers. These requirements are applicable to work at the site and will protect the health and safety of workers implementing the selected response action.

## **2. Chemical Specific**

#### Safe Drinking Water Act (SDWA)

40 CFR 141 - Federal Drinking Water Standards promulgated under the SDWA include both MCLs and Maximum Contaminant Level Goals ("MCLGs"). The NCP at 40 CFR 300.430(e)(2)(i)(B) provides that MCLGs established under the SDWA that are set at levels above zero, shall be attained by remedial actions for ground or surface waters that are current or potential sources of drinking water.

MCLs and non-zero MCLGs usually are applicable only at the drinking water tap from a public water supply, however, they are relevant and appropriate at this site because near the landfill, the same aquifers which exist below the Site are presently being used by residences in the area for drinking water and are expected to continue to be used in the future. The selected remedy and the contingent remedy both meet the MCL for arsenic (the only contaminant being considered for treatment at the Site). There is no MCLG for arsenic.

The Preamble to the NCP (55 FR 8753), provides that groundwater cleanup standards should generally be attained throughout the contaminant plume or at and beyond the edge of the waste management area when waste is left in place. This remedy and contingent remedy will meet the MCL for arsenic at the boundary of the final landfill cover and throughout the contaminant plume beyond the landfill boundary, because this is the area where humans could potentially be exposed to contaminated groundwater.

### **3. Location Specific**

#### Executive Order on Floodplain Management Exec. Order No. 11.988; 40 CFR 6.302(b)

The requirements of Executive Order No. 11.988 are applicable because the selected remedy and contingent remedy have the potential to impact the flood plain. Although no part of the landfill itself is on the flood plain, several monitoring wells are on the flood plain of the North Branch of the Kalamazoo River. Executive Order No. 11.988 requires that actions at the Site be conducted in a manner minimizing the impact on the flood plain. The selected remedy and the contingent remedy will be implemented in a manner that will minimize any adverse impact on the flood plain.

#### Executive Order on Protection of Wetlands Exec. Order No. 11.900; 40 CFR 6.302(a) and Appendix A

The requirements of Executive Order No. 11.900 are applicable because the selected remedy and contingent remedy may have the potential to impact wetlands. Although no part of the landfill itself is covered by wetlands, there are wetlands 400 feet south of the landfill, adjacent to the North Branch of the Kalamazoo River. The selected remedy and the contingent remedy will be implemented in a manner that will minimize any adverse impact on wetlands.

#### Endangered Species Act 16 USC. 1531 et seq.; 50 CFR Part 200, 50 CFR Part 402

The Endangered Species Act requires actions to conserve endangered or threatened species. The U.S. EPA consulted the

Department of the Interior and has determined that there are no endangered or threatened species in or around the Albion-Sheridan Township Landfill site and therefore, no endangered or threatened species will be impacted by site contamination or by site remediation.

**KEY STATE ARARS** (See Feasibility Study Report for complete listing of action, chemical and location specific ARARs.)

### **1. Action Specific**

Michigan Environmental Response Act (Act 307) -- Michigan Admin. Code R. 299.601 et seq.

Among other provisions, Act 307 authorizes the MDNR to issue regulations related to remediation of contaminated sites in the State of Michigan. Part 7 of the Act 307 Rules is an ARAR for this Site. This Part requires that a remedial action achieve a degree of cleanup identified by the Act as either Type A (cleanup to background levels or to a method detection limit), Type B (cleanup to risk-based levels) or Type C (cleanup under site-specific conditions).

At this site, the landfill itself could not be cleaned up to background or method detection levels (a Type A cleanup) nor to risk-based levels (a Type B cleanup) without excavating and removing the landfilled waste at a great cost which would yield little additional protection or environmental benefit.

For groundwater at this Site, background levels of arsenic may be achieved in time by natural oxidation, which is to be monitored by the selected remedy. The groundwater treatment required under the contingent remedy will not meet background levels during active treatment because U.S. EPA has determined that the additional treatment is not appropriate to the small amount of contamination present at the site and its partly naturally occurring origin. Type B criteria for arsenic are below the method detection limit and may never be met for groundwater at this Site because of the naturally occurring background levels of arsenic in groundwater.

U.S. EPA has determined that the substantive requirements of a Type C cleanup are relevant and appropriate at this Site. The substantive requirements of a Type C cleanup include a requirement that any remedial action which involves on-site containment of a hazardous substance shall include provisions for the long-term monitoring of the site to assure the effectiveness and integrity of the remedial action. The selected remedy and the contingent remedy will meet this requirement and all other substantive relevant and appropriate requirements of Act 307 with respect to a Type C cleanup.

Solid Waste Management Act (Act 641) -- Michigan Admin. Code R. 299.401 et seq.

Parts 3 and 4 of the Act 641 Rules establish closure and post-closure rules for industrial solid waste and municipal solid waste landfills. These rules are not applicable to the Site because it did not receive waste after October 9, 1991; however, the rules are relevant and appropriate. The FML cap selected for this landfill meets both the requirements of Rule 425(5) for a municipal solid waste cap and of Rule 304(6) for an industrial solid waste cap. The gas control and groundwater monitoring measures of the selected remedy and contingent remedy will also meet Act 641 requirements.

Michigan Air Pollution Act (Act 348) -- Michigan Admin. Code R. 336.1901 et seq.

This Act provides for fugitive dust control and emission control for air contaminants in quantities that will cause injurious effects and is an ARAR for this Site. The excavation of drums, cap construction, and other portions of the selected remedy and the contingent remedy will meet these requirements.

Michigan Soil Erosion and Sedimentation Control Act (Act 347)

This Act requires soil erosion control and sedimentation plans for any earth changes of one or more acres if within 500 feet of a lake or stream. The North Branch of the Kalamazoo River is within 500 feet of this landfill, therefore this Act is an ARAR for the Site. The earthmoving portions of the selected remedy and the contingent remedy will meet these requirements.

Michigan Comp. Laws Ann. Section 257.722 ("Frost Laws")

These requirements pertain to maximum axle loads permitted over certain Michigan highways during certain months of the year, to prevent damage caused by excessive loads during the period when the weather alternates between freezing and thawing. These requirements are not ARARs because they do not pertain to on-site activities; however, they do constitute applicable off-site requirements.

### **3. Cost Effectiveness**

Cost effectiveness compares the effectiveness of an alternative in proportion to its cost of providing environmental benefits. The costs associated with the implementation of the entire selected remedy and the contingent remedy are listed below. The present value costs below are lower than those issued in the Proposed Plan because the discount rate was updated to 7 percent.

Total estimated costs for the selected remedy at the Albion-Sheridan Township Landfill Site are:

<u>Capital Cost</u>	<u>O&amp;M.</u>	<u>Present Value</u>
\$ 2,654,734	\$ 1,197,801	\$ 3,852,535

If the contingent remedy for groundwater treatment is implemented at the site, the total estimated costs for the selected remedy are:

<u>Capital Cost</u>	<u>O&amp;M, 30 Yr.</u>	<u>Present Value</u>
\$ 3,086,196	\$ 1,345,923	\$ 4,432,119

Both the selected remedy and the contingent remedy for this site are cost effective because they provide the greatest overall effectiveness proportionate to costs when compared to the other alternatives evaluated. The estimated cost of drum removal and disposal is proportionate to the risk reduced by removing known hazardous wastes and liquid wastes which could easily contaminate groundwater. The estimated cost of the selected landfill cap is intermediate between the other two cap alternatives and assures a high degree of certainty that the remedy will be effective in the long-term due to the significant reduction of the mobility of the contaminants achieved through containment of the source material and the decrease in leachate generation. The estimated cost of groundwater monitoring, and the additional cost of in-situ treatment of arsenic to the MCL if necessary, are proportionate to the risk present from the groundwater. The addition of arsenic treatment to below the MCL by either in-situ or ex-situ methods would provide only a limited additional reduction of risk to public health and the environment, which is not justified by the additional cost for these alternatives, since it is believed that additional lowering of contaminant levels will occur by natural oxidation.

#### **4. Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable**

The selected remedy and contingent remedy represent the maximum extent to which permanent solutions and alternative treatment technologies can be used in a cost-effective manner at this site. Of those alternatives that are protective of human health and the environment and that comply with ARARs, U.S. EPA has determined that the selected remedy and the contingent remedy provide the best balance in terms of long-term effectiveness and permanence, reduction of toxicity, mobility, or volume of contaminants, short term effectiveness, implementability, and cost, taking into consideration State and community acceptance.

The removal of hazardous and liquid waste drums, installation and maintenance of a final cover for the landfill, groundwater monitoring, and restriction of site access through installation of a fence and institutional controls, will provide the most permanent solution that is practical and proportionate to the cost.

#### **5. Preference for Treatment as a Principal Element**

Based on current information, U.S. EPA and the State of Michigan believe that the selected remedy and the contingent remedy are protective of human health and the environment and utilize permanent solutions and alternative treatment technologies to the maximum extent possible. The selected remedy satisfies the statutory preference for treatment of the hazardous substances present at the site as a principal element by requiring treatment of drummed hazardous wastes present on site. The selected remedy also includes treatment of gasses generated by the landfill, unless ARARs are met without treatment. If the contingent remedy is implemented, groundwater also will be actively treated in-situ to remove arsenic.

#### **L. SUMMARY**

The selected remedy and the contingent remedy will satisfy the statutory requirements established in Section 121 of CERCLA, as amended by SARA, to protect human health and the environment, will comply with ARARs, will provide overall effectiveness proportionate to its costs, and will use permanent solutions and alternate treatment technologies to the maximum extent practicable. Treatment of hazardous wastes found on site is a component of the selected remedy. Treatment is also a component of the contingent remedy for groundwater clean-up, if natural oxidation does not occur as fast as predicted.

#### **M. RESPONSIVENESS SUMMARY**

The public participation requirements of CERCLA sections 113 (k) (2) (i-v) and 117 of CERCLA have been met during the remedy selection process. Section 113(k) (2) (B) (iv) and 117(b) of CERCLA requires the EPA to respond "...to each of the significant comments, criticisms, and new data submitted in written or oral presentations" on a proposed plan for a remedial action. The Responsiveness Summary addresses concerns expressed by the public, potentially responsible parties (PRPs), and governmental bodies in written and oral comments received by EPA and the State regarding the proposed remedy for the Albion-Sheridan Township Landfill Site.

## Background

U.S. EPA issued a fact sheet to the public in Albion, Michigan, at the beginning of the Remedial Investigation. The Agency also hosted a public meeting on August 25, 1992, to provide background information on the Albion-Sheridan Township Landfill site, explain the Superfund process, and provide details of the upcoming investigation. The remedial investigation was completed in July, 1994, and in August, 1994, U.S. EPA issued a second fact sheet to summarize the results of the investigation.

The RI/FS reports and the Proposed Plan for the Albion-Sheridan Township Landfill site were released to the public for review in September, 1994. An information repository has been established at the following location: Albion Public Library, 501 S. Superior Street, Albion, Michigan. The Administrative Record has been made available to the public at the U.S. EPA Docket Room in Region V and at the information repository.

A public meeting was held on October 5, 1994 to discuss the FS and the Proposed Plan. At this meeting, representatives from the U.S. EPA and MDNR answered questions about the Site and the remedial alternatives under consideration. Formal oral comments on the Proposed Plan were documented by a court reporter. A verbatim transcript of this public meeting has been placed in the information repositories and Administrative Record. Written comments were also accepted at this meeting. The meeting was attended by approximately 35 persons.

The FS and Proposed Plan were available for public comment from October 3, 1994, through December 4, 1994. Comments received during the public comment period and U.S. EPA's responses to those comments are discussed below and are a part of this ROD. Advertisements announcing the availability of the Proposed Plan, start of the comment period and extension of the comment period were published in the Albion Reporter.

During the comment period, EPA received approximately 11 written submittals containing comments on the proposed plan.

## Summary of Significant Comments

### **Comments by the Calhoun County Health Department**

COMMENT: The Calhoun County Health Department supports the recommended alternatives.

COMMENT: They would like to leave the option open for Alternative 5B if monitoring showed an increase in any hazardous levels of contamination or if the groundwater plume changes direction.

RESPONSE: U.S. EPA has chosen Alternative 5B (in-situ treatment of groundwater) as a contingent remedy, which will be implemented if arsenic contamination in groundwater is not decreasing fast enough or if residential wells are threatened. Other contaminants are not present in the groundwater at hazardous levels. The groundwater monitoring which is part of both the selected and contingent remedy includes monitoring of flow directions.

#### **Comments by the Officers of the Church of the Nazarene**

COMMENT: The officers of the Church of the Nazarene are concerned because they live close to the area and are concerned about their members and children at their church and in the neighborhood. They recommend the following:

Remove drums  
Cap landfill  
Treat gas  
Monitor groundwater

RESPONSE: In general, U.S. EPA agrees with these recommendations. However, the Agency may allow landfill gasses to be vented without treatment if it is demonstrated that is safe and will meet all applicable or relevant and appropriate requirements.

#### **Comments by Private Citizens**

COMMENT: Mr. Kenneth Lampart agrees with the recommended alternatives: 2, 3C, 4B, 5A, and any or all other actions needed to protect the public of Albion-Sheridan Township and Jackson County, Parma Township, and Amberton Village.

COMMENT: Mr. Lampart asks why this process is taking so long.

RESPONSE: U.S. EPA's initial action at this site was the removal of drummed waste from the surface of the landfill, where passers-by might come into contact with hazardous wastes. This action was accomplished relatively quickly following notification. The other possible threats at the site -- the large mass of buried wastes, possible contamination of soils, surface and groundwater surrounding the site -- did not appear to present as much of an immediate threat and so were dealt with under the Remedial Program at U.S. EPA. The Remedial Program takes more care to thoroughly understand the extent of contamination at the site, so that the cleanup actions which are taken can be the final actions needed at the site. The Remedial Investigation/Feasibility Study at this site took three years to complete, which is slightly faster than the average time of four years. This time was spent investigating and negotiating with potentially responsible parties, investigating the site, studying possible clean-up

options, conferring with the State of Michigan and the public, and choosing an option.

COMMENT: Mr. Lampart asks what kind of water and other contaminants he is unknowingly subjected to from elsewhere.

RESPONSE: The purpose of U.S. EPA's investigation was to determine the nature and extent of contamination from the Albion-Sheridan Township Landfill site. No significant contamination was discovered from other sources during our investigation.

COMMENT: Mr. Lampart asks when the "22 full drums and 24 empty drums" were removed from the landfill, how many contained hazardous wastes, solids, and liquids? He also asks how deep the samples were taken from.

RESPONSE: The 1990 removal report documents that the drums appeared to contain grease and paint wastes, but does not indicate how many were solids and liquids. Four drums were analyzed and found to contain hazardous wastes. All of the drums removed in 1990 were found on the surface of the landfill. During its later investigation, U.S. EPA sampled landfill wastes up to 36 feet deep at three locations and found no hazardous wastes. However, hazardous wastes were found by the MDNR in drums buried at one location in the landfill. This ROD requires removal of those drums which contain hazardous or liquid wastes, which could contaminate groundwater.

COMMENT: Mr. Lampart asks, if he entered the fenced in area and walked around, would his health be at risk from exposure?

RESPONSE: The fence was put up for that very purpose, to eliminate any health risk from exposure to waste which is inside the fence. Although much of the waste inside the fence is presently covered by sandy soil, there are areas where it is exposed on the surface.

COMMENT: Mr. Lampart asks, since the Kalamazoo River is not of any significant health risk, should he get his drinking water from there?

RESPONSE: Although there are no significant health risks to recreational use of the North Branch of the Kalamazoo River caused by the landfill, U.S. EPA does not recommend using it as a drinking water source without appropriate treatment.

COMMENT: Mr. Lampart asks, what is the one location where arsenic presently exceeds the federal drinking water standards and is anybody using water from this location now?

RESPONSE: The concentration of arsenic exceeds drinking water standards in one monitoring well (MW06SB), drilled by U.S. EPA

immediately adjacent to the landfill. No one is using this well as a drinking water source and there are no residential wells adjacent to this monitoring well. The residential well closest to the landfill is located immediately south of the landfill and is deep enough not to be contaminated by the landfill plume.

COMMENT: Mr. Lampart asks whether Harrington School might have received exposure from the landfill, for example by truck traffic, dust, or wind, and whether in general the air is safe when the wind blows off the dump site.

RESPONSE: Although there is no way of knowing historical exposure patterns, U.S. EPA's investigation showed no exposure to the Harrington School from the Albion-Sheridan Township Landfill site at this time. With the current vegetative cover, there is minimal dust generated from the site and gas generated by the landfill is released over a wide area at low concentrations. However, U.S. EPA believes expeditious construction of the landfill cap and implementation of landfill gas controls will further insure the safety of surrounding residents and businesses. The type of cap chosen by U.S. EPA for this landfill uses a flexible membrane liner instead of clay to stop infiltration and therefore will involve a lower level of truck traffic during construction than a clay cap.

COMMENT: Mr. Lampart asks whether the water for Amberton Village should be filtered or treated before it is supplied to homes and whether it is safe to drink the water from residences near the landfill.

RESPONSE: The Amberton Village well and all residential wells near the landfill were sampled during the remedial investigation and will continue to be monitored in the future. Water in all of the residential wells and the Amberton Village well met federal drinking water standards and is safe to drink.

COMMENT: Mr. Alan R. Moore states that during the public hearing, contaminants were listed as "low" and asks that they be listed as actual values compared to average background.

RESPONSE: There are too many actual values involved to list here. However, the Remedial Investigation Report lists all actual values and background values for surface and subsurface soils, groundwater and surface water sampled at the site. This Report is part of the Administrative Record for the site and is available at the Site Repository at the Albion Public Library and at U.S. EPA Region 5 headquarters in Chicago.

COMMENT: Mr. Moore asks whether there could be a cost/benefit analysis for the remedy.

RESPONSE: As is discussed in Section H of this ROD, U.S. EPA bases its remedy selection on nine criteria. To be considered for final selection, a remedy must provide overall protection of human health and the environment and must comply with all applicable or relevant and appropriate requirements (or provide grounds for a waiver). The proposed remedy is then selected by determining which provides the best combination of attributes with respect to long-term effectiveness; short-term effectiveness; reduction in toxicity, mobility, or volume; implementability; and cost. The final remedy is selected based on all these criteria and State and community acceptance, based on comments received during the public comment period. The Superfund process as provided in the National Contingency Plan at this time does not include assigning dollar values to improvements in human health risks and the environment, as would be required in a cost/benefit analysis.

COMMENT: Mr. Moore asks why the landfill contents couldn't be excavated and placed in an approved sanitary landfill.

RESPONSE: The costs associated with this would be prohibitive. In addition, the amount of time required to excavate and transport all of the waste would place nearby residences and businesses at risk from much greater exposure than capping the landfill in place.

COMMENT: Ms. Sally Ammerman asks how close to the landfill new drinking waters wells would have to be, to be at risk.

RESPONSE: This ROD requires the imposition of deed restrictions or local ordinances prohibiting domestic use water wells which draw water from the arsenic contaminant plume shown on Figure 4. This area extends approximately 600 feet to the southwest of the landfill. Outside of this area, arsenic is at or below the natural background level in the region. Water wells close to the plume boundary (defined as 2 ug/l arsenic) shown on Figure 4 may draw water from the plume if they are very shallow; deeper wells, such as the existing private well immediately south of the landfill, may not be affected because they are deeper than the plume.

COMMENT: Ms. Ammerman, Mr. Robert Lopez, and Mr. Mike LaNoue are concerned that drilling of large volume water wells by the proposed Albion Renewable Energy Power Plant may cause migration of contaminants from the landfill to the City of Albion's Clark Pumping Station or to private water wells. Mr. Lopez also requests that the hydrogeological study include the area of the proposed plant.

RESPONSE: If the proposed plant is built, it is very unlikely that wells at that location would have any affect on the contaminant plume at the landfill. However, if wells were

proposed at that or any other location which were likely to spread the contaminant plume or change its flow direction, U.S. EPA and MDNR have the authority to take action to protect human health and the environment, under CERCLA Section 104 and 106 and Michigan Act 307, including seeking legal injunctions.

The hydrogeological study of the Albion-Sheridan Township Landfill did not include the area of the proposed plant because it is approximately 3/4 mile upgradient of the landfill. Except for wells installed to determine background conditions, the majority of U.S. EPA's hydrogeological investigation was concentrated on areas down-gradient of the landfill, the direction in which contaminants would flow.

COMMENT: Ms. Doreene Derr, Mr. Robert Lopez, and Mr. Mike LaNoue each stated that there are six Superfund Sites in the Albion area and it is essential for Project Managers to coordinate with each other. Others at the public meeting held to discuss U.S. EPA's Proposed Plan were confused about the various governmental lists of cleanup sites.

RESPONSE: U.S. EPA agrees that it is important for Project Managers of Superfund sites to coordinate and to consider the wider community in all Superfund site decisions. In some cases, such as at the Albion-Sheridan Township Landfill, contamination is fairly localized and does not interact with any other contamination in the area.

Although there are multiple contamination sites in Albion, U.S. EPA considers only two to be Superfund sites. Historically, the term "Superfund Sites" has meant those on the National Priorities List, a list of high-priority cleanup sites which are eligible for funding using Superfund money. The two sites in this category in Albion are the McGraw-Edison Corporation Site and the Albion-Sheridan Township Landfill Site. A soil and groundwater cleanup is in progress at the McGraw-Edison site.

As the commentators have pointed out, there are a number of additional sites in the Albion area designated as sites of environmental contamination on a list, compiled by the Michigan Department of Natural Resources, of sites addressed or needing to be addressed under the Michigan Environmental Response Act (MERA or Act 307). These sites and others may also appear on a master list of sites addressed or needing to be addressed under the Federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This federal list is called the CERCLA Information System, or "CERCLIS". Following investigation, State or Federal action may or may not be taken at these additional sites.

COMMENT: Mr. LaNoue requests that U.S. EPA form a geographic initiative area in Albion to address the multiple waste sites and

other environmental concerns in the Albion area. He also made additional comments concerning the proposed Albion Renewable Energy Power Plant.

RESPONSE: U.S. EPA declines to designate Albion as a geographic initiative area at this time. U.S. EPA and the States undertake geographic initiatives to accelerate environmental protection in areas which, because of their size and/or complexity, outstrip the resources and authorities of a single agency. Historically, these areas have been chosen through comparative risk assessments. The geographic initiatives undertaken in Region 5 to date are in major urban areas (e.g. Detroit/southeast Michigan) or areas of high industrial concentration (e.g., Gary/northwest Indiana). Albion is small enough that U.S. EPA and the Michigan Department of Natural Resources believe they can coordinate together without an official designation as a geographic initiative area.

U.S. EPA notes Mr. LaNoue's comments concerning the proposed power plant, but does not respond to them here, since this responsiveness summary focuses on the Albion Sheridan Township Landfill Site. We recommend Mr. LaNoue and other concerned citizens contact the Michigan Department of Natural Resources concerning the current status of the project as it is our understanding that it may be temporarily or permanently on hold.

**Comments by Potentially Responsible Parties:**

COMMENT: **Hull & Associates, Inc. ("HAI"), commenting on behalf of the City of Albion**, states that they generally concur with the approach presented in the Proposed Plan for the Site.

COMMENT: **HAI, Corning, Inc. ("Corning") and Cooper Industries ("Cooper")** agree with Alternative 2A for removal and disposal of drummed waste. HAI recommends the ROD incorporate language which could provide the flexibility to limit removal to only drums that are structurally sound and determined to contain hazardous waste in order to minimize transport/disposal costs and reduce exposure risks during closure. They recommend that criteria for determining which drums stay and which are to be removed be incorporated into the ROD. Corning wishes to confirm their understanding that any drums found that contain non-hazardous solid waste would be left in the landfill as they pose no threat to groundwater. Cooper Industries agrees with the Agency that drums containing unidentified liquids and solid hazardous waste which are discovered during the remedial action will be properly disposed.

RESPONSE: U.S. EPA agrees that only drums which are structurally sound enough to be removed with wastes essentially intact should be removed from the landfill. The ROD provides specific language concerning the selection of drums for off-site disposal.

Corning's understanding is correct that drums containing non-hazardous solid wastes would be left in the landfill. Details of drum removal and disposal can be found in Section I of the ROD.

COMMENT: **HAI and Corning** concur with the recommendation for a flexible membrane liner (FML) to cap the landfill rather than a clay cap, because it will be a more effective barrier for reducing surface water infiltration and is probably the most cost effective.

COMMENT: **HAI, Corning, and Cooper** state that the FML cap configuration as shown on Figure 3.3 of the FS should be changed so that the permeable drainage layer is immediately above the FML, to provide more protection against punctures in the liner and a better drainage pathway. They also recommend that the ROD allow for performance demonstrations that alternate material (i.e., geocomposite) can be considered for a drainage layer.

RESPONSE: U.S. EPA has considered the technical merits of this request and determined that the requested change should be made. Section I of the ROD specifies the drainage layer to be directly on top of the FML and also incorporates the requested flexible in material.

COMMENT: **HAI, Corning, and Cooper** all support the installation of a passive gas venting system, at least initially. **HAI** states that an active extraction system is known to exacerbate landfill settlement, which ultimately may result in increased cap maintenance costs. In addition, **HAI** states that since a gas monitoring plan will have to be developed for the site, it will be possible to monitor the effectiveness of a passive venting system. **Corning** states that the generation rate and composition of landfill gas should be evaluated during Remedial Design and the interconnected piping and blower/flare facility of an active system should be added only if the gas concentrations exceed ARARs. **Cooper** states that it is U.S. EPA's proposal that the passive venting points be installed first, with active gas collection to be added only if vented concentrations exceed U.S. EPA or MDNR criteria.

RESPONSE: In Section I of this ROD, U.S. EPA is requiring installation of an active gas collection and treatment system **unless**, during the design phase, it is demonstrated that a passive gas venting system will meet all applicable or relevant and appropriate requirements. If U.S. EPA's evaluation, in cooperation with that of the MDNR, indicates that passive venting will meet all requirements, it will be approved.

COMMENT: **HAI and Corning** agree with the selected groundwater alternative for groundwater monitoring. **HAI** states that the concentration and extent of the groundwater contamination does not appear to warrant the implementation of an active groundwater

remedy, nor present a significant risk to human health and the environment. Corning states that the reduced infiltration through the waste material and the natural attenuation of arsenic should mitigate the impacts to groundwater at the site.

COMMENT: **HAI** requests that the U.S. EPA provide the rationale for such an extensive groundwater monitoring program (especially the quarterly monitoring of residential wells) in light of the objective defined in the FS. The groundwater flow conditions of the bedrock aquifer documented in the RI indicate that nearby residential wells apparently receive water from the northwest (presumably the wells are set into the bedrock) and, thereby, to a large degree, are hydraulically isolated from the landfill. The monitoring of these residential wells should only occur as a contingency based on groundwater quality results of wells affected by the landfill, rather than a pre-determined, arbitrary quarterly schedule.

RESPONSE: The groundwater monitoring system under the selected alternative has several purposes: to monitor the effectiveness of natural oxidation in reducing arsenic concentration, to monitor other contaminants which are emanating from the site at less hazardous levels, and to ensure that there is no impact to any residential wells from contamination emanating from the site. As explained in Section I of the ROD, the ROD retains flexibility regarding which specific wells will be monitored in the long term and regarding many details of the sampling schedule.

The RI groundwater flow maps do not indicate that the groundwater source for these wells is from the northwest. Rather, the flow maps, along with the groundwater plume contour maps show groundwater from the landfill heading southwest towards the residential wells on East Erie Road. The U.S. EPA believes that quarterly sampling for residential wells is appropriate given the close proximity of the wells to the landfill.

COMMENT: **HAI** states that the ROD should include language which allows the proposed groundwater monitoring network to be amended by data collected from the installation of the two proposed monitoring well nests.

RESPONSE: The ROD requires the installation of four additional monitoring wells during the design phase, including one well nest of two wells and two isolated wells. As explained in Section I of the ROD, the ROD retains flexibility regarding which specific wells will be monitored in the long term and regarding many details of the sampling schedule.

COMMENT: Several parties commented on parameters to be analyzed in the groundwater monitoring program. **HAI** assumes that groundwater samples will be analyzed for only inorganic parameters because they state that no volatile organic compounds

which could be directly attributed to the landfill were detected. HAI also states that a semi-annual VOC sampling frequency is more appropriate given the results of the risk assessment and the requirements of Act 641. **Corning, Inc.** comments that the groundwater analytical program has not been specified and that they recommend that the analytical program include only the analytes of concern identified during the Remedial Investigation. **Cooper Industries** suggests that TAL/TCL analytes be used for the initial sampling of any newly installed well, with subsequent quarterly and annual testing to be for only those analytes of concern to Cooper and the Agency.

RESPONSE: Section I of the ROD includes some flexibility for developing a target list for groundwater monitoring once a sufficient data set has been established. The ROD requires one complete round of groundwater samples to be analyzed for Target Compound List and Target Analyte List parameters, ammonia and field parameters, to provide a wider basis for design of the groundwater monitoring program. For subsequent long-term monitoring, the ROD retains some flexibility regarding the target parameter list.

COMMENT: **Corning and Cooper** state that the Feasibility Study recommends 30 mil PVC or 40 mil VLDPE for the liner material. Corning and Cooper recommend a stronger and thicker material such as 40 to 60 mil HDPE for the liner. Corning states that the sturdier liner material will be easier to install, is less likely to tear during installation, and will have better seam integrity.

RESPONSE: The ROD requires a flexible membrane liner which is equivalent to or less permeable than a 40 mil low density polyethylene or 30 mil polyvinyl chloride. If U.S. EPA determines during the remedial design that a stronger or thicker material should be used for the liner, the ROD allows that flexibility.

COMMENT: **Corning** states that the composite liner system provides only 30 inches of cover for the FML and that an additional six inches of cover soil should be added to ensure that the FML is below the frost line. **Cooper** states that they are evaluating whether the 30" depth to the flexible membrane liner is sufficient to prevent rupture during Michigan freeze/thaw cycles, and requests the Agency consider allowing parties the option to increase the depth of the FML by providing a thicker cover, if warranted.

RESPONSE: The landfill cover required in the ROD is a minimum thickness. U.S. EPA does not believe it is essential for an FML to be below the frost line. However, if U.S. EPA determines during Remedial Design that thicker layers should be used, the ROD allows that flexibility.

COMMENT: **Corning and Cooper** state that the general landfill cap contours in the Feasibility Study show steep slopes where "cut and

fill" regrading of the existing topography could reduce slope angles, provide better stability, and reduce cap material volumes. They request flexibility in the contour design to accommodate these potential benefits.

RESPONSE: There is flexibility included in the ROD concerning the final slopes and how they are attained, although the requirements of Michigan Act 641 must be met. Private property boundaries may restrict cut and fill regrading in some areas. These are described in Section I of the ROD.

COMMENT: **Corning** states that the groundwater monitoring program for the site, as specified in the Feasibility Study, includes 27 wells. It is Corning's understanding that four new wells will be installed during the Remedial Design phase and added to the long-term monitoring program to be sampled during quarterly and/or annual events.

RESPONSE: The ROD requires the installation of four additional monitoring wells during the design phase. As explained in Section I of the ROD, the ROD retains flexibility regarding which specific wells will be monitored in the long term and regarding many details of the sampling schedule. The monitoring scheme presented in the Feasibility Study is an example of a monitoring program which would be acceptable by U.S. EPA.

COMMENT: **Cooper** states that the RI/FS Report is silent regarding supplemental investigation activities; however, during a meeting U.S. EPA mentioned the need for additional monitoring wells to be installed during the remedial design phase of the project. Cooper believes that the current monitoring well network and associated compliance monitoring at the site is sufficient to determine the effectiveness of the cap to prevent leaching to groundwater and to ensure that there is no potential impact to domestic water supplies.

RESPONSE: U.S. EPA has determined, in consultation with the MDNR, that the new wells are necessary and they are required by this ROD. The four additional monitoring wells are shown on Figure 3.4 of the Feasibility Study as proposed new wells and were also included in the Proposed Plan which was available for public comment from October 3 to December 4, 1994. The wells at MW15 and MW16 are needed to further define the contaminant plume to the west and south of the site, respectively, in areas where the groundwater gradients are low and flow directions somewhat variable. The MW15 well is intended to ensure that no contamination is flowing toward the Orchard Knoll Subdivision, where groundwater contaminants of unknown origin were detected in the past. The two deep bedrock wells (at MW16 and MW09) are needed to further define the vertical extent of contamination, since at present there is only one deep bedrock well at the site.

COMMENT: **Cooper** states that the Risk Assessment Report does not identify which analytical methods are to be utilized for the quarterly and annual groundwater monitoring well compliance sampling detailed in Figure 3.4.

RESPONSE: The ROD retains some flexibility regarding analytical methods for groundwater monitoring, although it does require that methods have detection limits at or below the federal maximum contaminant level (MCL), for those analytes which have an MCL. Specific methods will be approved as part of a Quality Assurance Project Plan during Remedial Design.

COMMENT: **Cooper** states that the RI Report describes that residential wells, surface water samples, and selected groundwater monitoring well samples were analyzed using the "Region 5 Residential Well REQUIRES." No laboratory contacted by Cooper was familiar with the "Region 5 Residential Well REQUIRES." Cooper requested and has been supplied with the analytes of concern and associated detection levels, but that information is still not specific enough regarding the "Region 5 Residential Well REQUIRES" protocols to allow comment by Cooper. For residential wells, Cooper suggests that a gas chromatograph method, which has lower detection levels than a typical GC/MS method and is a more standard methodology, be used rather than the Region 5 Residential Well REQUIRES.

RESPONSE: During the Remedial Investigation, residential wells samples and selected other samples were analyzed under U.S. EPA's Contract Laboratory Program as a Special Analytical Service (REQUIRES) because lower detection limits were needed. As discussed in Section I of the ROD, the specific analysis methods for groundwater samples during Remedial Design and Remedial Action will be proposed by the party conducting the design and subject to approved by U.S. EPA as part of the Quality Assurance Project Plan.

## N. GLOSSARY

### Applicable or Relevant and Appropriate Requirements (ARARs)

Section 121 (d) of CERCLA requires that remedial actions meet legally applicable or relevant and appropriate requirements (ARARs) of other environmental laws. Legally "applicable" requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria or limitations promulgated under Federal or State law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstances at a CERCLA site. "Relevant and appropriate" requirements are those requirements that, while not legally applicable to the remedial action, address problems or situations sufficiently similar to those encountered at the site that their use is well suited to the remedial action.

Non-promulgated advisories or guidance documents issued by federal or state governments ("to-be-considered or TBCs") do not have the status of ARARs; however, where no applicable or relevant and appropriate requirements exist, or for some reason may not be sufficiently protective, non-promulgated advisories or guidance documents may be considered in determining the necessary level of clean up for protection of human health and the environment.

#### Aquifer

A body of rock that is sufficiently permeable to conduct groundwater and to yield economically significant quantities of water to wells and springs.

#### Baseline Risk Assessment

The baseline risk assessment is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these releases. The baseline risk assessment assumes no corrective action will take place and no site-use restrictions or institutional controls such as fencing, groundwater use restrictions or construction restrictions will be imposed. There are four steps in the baseline risk assessment process: data collection and analysis; exposure assessment; toxicity assessment; and risk characterization.

#### Cancer Potency Factors (CPFs)

Cancer potency factors (CPFs) have been developed by EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CPFs, which are expressed in units of  $(\text{mg/kg-day})^{-1}$ , are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the CPF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. Cancer potency factors are derived from the results of human epidemiological studies or chronic animal bioassays.

#### Comprehensive Environment Response, Compensation, and Liability Act (CERCLA)

A federal law passed in 1980 and revised in 1986 by the Superfund Amendments and Reauthorization Act. CERCLA created a special tax that goes into a trust fund, commonly known as "Superfund", to investigate and clean up abandoned or uncontrolled hazardous waste sites.

#### Excess Lifetime Cancer Risks

Excess lifetime cancer risks are the sum of all excess cancer lifetime risks for all contaminants for a given scenario. Excess Lifetime Cancer Risks are determined by multiplying the intake

level by the cancer potency factor for each contaminant of concern and summing across all relevant chemicals and pathways. These risks are probabilities that are generally expressed in scientific notation (e.g.  $1 \times 10^{-6}$ ). An excess lifetime cancer risk of  $1 \times 10^{-6}$  indicates that a person's chance of contracting cancer as a result of site related exposure averaged over a 70-year lifetime may be increased by as much as 1 in one million.

#### Groundwater

The water beneath the earth's surface that flows through soil pores and rock openings. Often utilized as a source of drinking water.

#### Hazard Index (HI)

The Hazard Index (HI), an expression of non-carcinogenic toxic effects, measures whether a person is being exposed to adverse levels of non-carcinogens. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across multiple media. The HI for non-carcinogenic health risks is the sum of all contaminants for a given scenario. Any Hazard Index value greater than 1.0 suggests that a non-carcinogen potentially presents an unacceptable health risk.

#### Inorganic compounds

Chemical compounds that are composed of mineral materials, including salts and minerals such as iron, aluminum, mercury, and zinc.

#### Leachate

A liquid (usually water from rain or snow) that has percolated through wastes and contains components of those wastes.

#### MCLs

These are Maximum Contaminant Levels (see primary Drinking Water Standards).

#### National Priority List (NPL)

U.S. EPA's list of top priority hazardous waste sites that are eligible for federal money under Superfund.

#### National Contingency Plan (NCP)

The Federal regulation that sets the framework for the Superfund program. The NCP identifies the governmental organizations involved in the remedial response, outlines their roles and responsibilities, and discusses the interrelationships of these organizations. In addition, the NCP provides guidelines for planning and conducting response activities.

#### Organic Compounds

Chemical compounds composed primarily of carbon, including materials such as solvents, oils, and pesticides.

Permeability

The ease with which groundwater moves through earth materials. Movement is controlled by the size and shape of spaces between these materials.

Present Value Cost

An economic term used to describe today's cost for a Superfund cleanup and reflect the discounted value of construction and future operation and maintenance costs. U.S. EPA uses present value costs when calculating the cost of alternatives for long-term projects.

Primary Drinking Water Standards (MCLs)

Primary Drinking Water Standards are maximum contaminant levels (MCLs) set for substances that can pose a threat to health when present in drinking water at certain levels. Because these substances are of concern for health (not just aesthetic) reasons, primary MCLs are enforceable under the Safe Drinking Water Act.

Record of Decision (ROD)

A document signed by EPA's Regional Administrator, outlining the selected remedy for a Superfund site. The ROD includes the Responsiveness Summary, which addresses concerns presented to EPA during the public comment period.

Reference Doses (RfDs)

Reference doses (RfDs) have been developed by U.S. EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting non-carcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of average daily exposure levels for humans, including sensitive individuals. Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse non-carcinogenic effects to occur.

Resource, Conservation and Recovery Act of 1976 (RCRA)

The federal law that establishes a regulatory system to require the safe and secure procedures to be used in treating and disposing of hazardous waste.

Semi-Volatile Organic Compounds (SVOCs)

Organic chemicals that vaporize less readily than VOCs. These compounds include many polynuclear aromatic hydrocarbons and pesticides.

Superfund Amendments and Reauthorization Act of 1986 (SARA)  
Amendments to the Superfund Law, CERCLA.

Volatile Organic Compounds (VOCs)

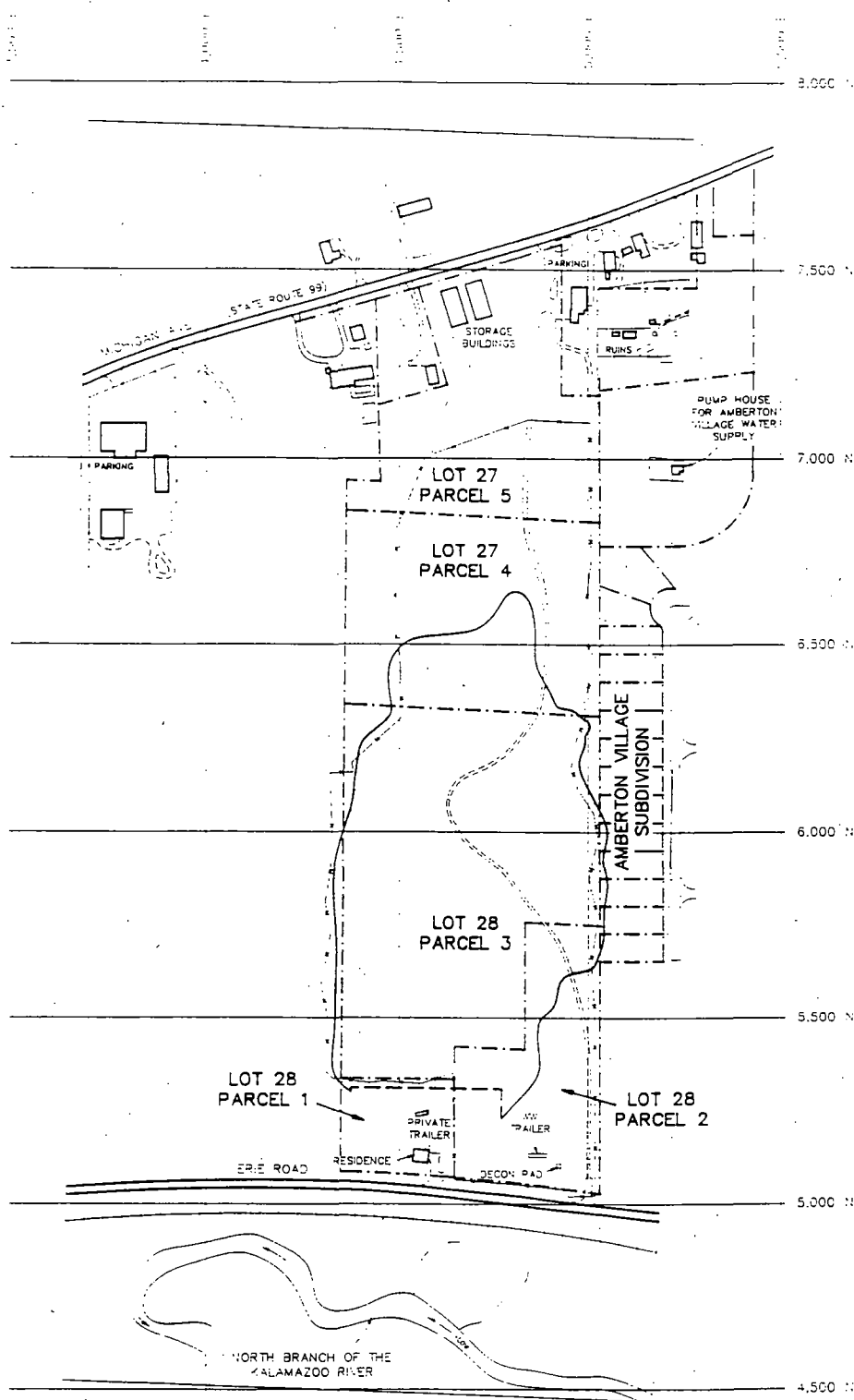
Organic chemicals, such as methylene chloride and benzene, that vaporize easily. Some VOCs found at the site include carbon tetrachloride, vinyl chloride, benzene, and chloroform.

Wetlands

Areas that are inundated by surface or groundwater with sufficient frequently to support vegetative or aquatic life that depends upon saturated or seasonally saturated soil conditions for growth and reproduction. 40 CFR Pt.6, App.A, Section 4 (j).

## LIST OF FIGURES AND TABLES

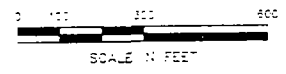
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PARCEL #	OWNER
1	LISTERVILLE W&E PRATER
2	LISTERVILLE W&E PRATER
3	STATE OF MICHIGAN
4	STATE OF MICHIGAN
5	LEE LUELLA PATRICK

- LEGEND**
- APPROXIMATE LANDFILL BOUNDARY (DASHED PORTIONS INDICATE THE SURVEY GRID BOUNDARY)
  - PROPERTY BOUNDARY
  - UNPAVED ROAD
  - INTERMITTENT STREAM
  - RAILROAD TRACK
  - FENCE LINE

FIGURE 1



SLB-BV  
P126393

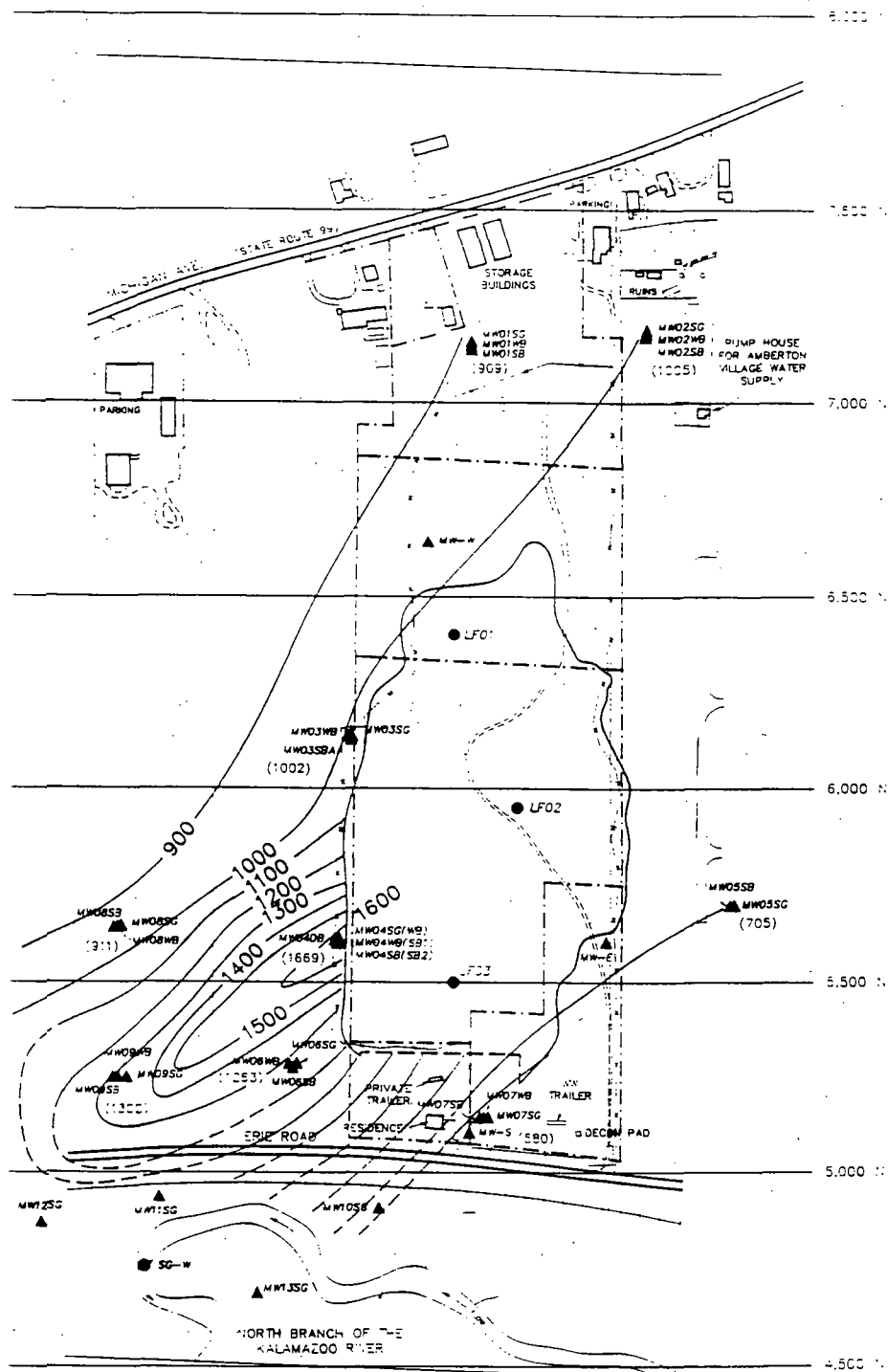
**PROPERTY  
BOUNDARY MAP**

ALBION-SHERIDAN TOWNSHIP LANDFILL  
ALBION, MICHIGAN

DECEMBER, 1993

0401100





### LEGEND

- APPROXIMATE LANDFILL BOUNDARY (DASHED PORTIONS INDICATE THE SURVEY GRID BOUNDARY)
- PROPERTY BOUNDARY
- ===== UNPAVED ROAD
- - - - - INTERMITTENT STREAM
- RAILROAD TRACK
- ▲ MONITORING WELL LOCATION
- LEACHATE WELL LOCATION
- STAFF GAUGE LOCATION
- 1000 — SPECIFIC CONDUCTANCE ISOCONCENTRATION CONTOUR (umhos/cm)
- FENCE LINE

FIGURE 3

0 100 200 300  
SCALE IN FEET

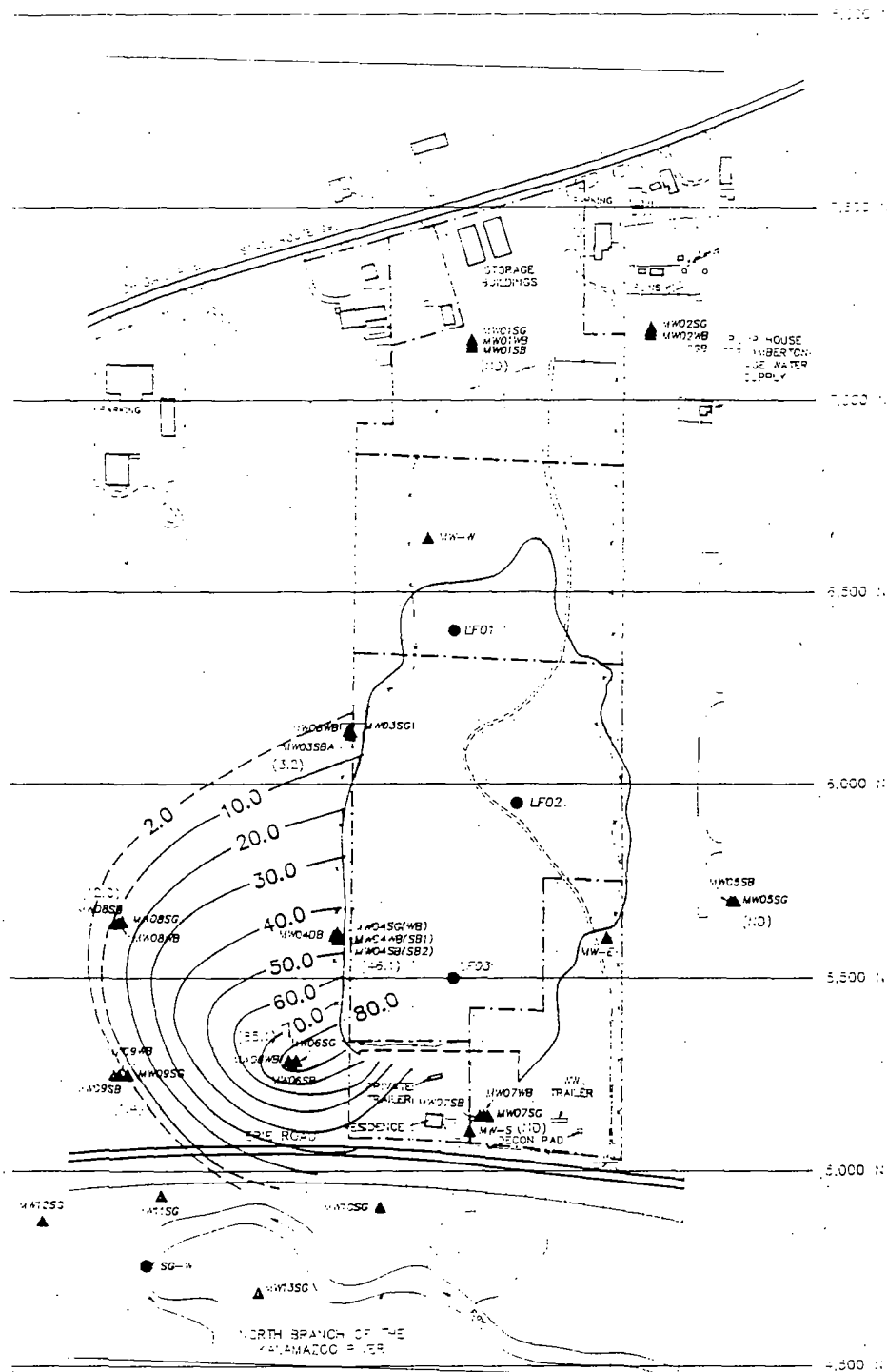
CONC-SB  
P120993

SPECIFIC CONDUCTANCE  
ISOCONCENTRATION MAP  
SHALLOW BEDROCK

ALBION-SHERIDAN TOWNSHIP LANDFILL  
ALBION, MICHIGAN

DECEMBER, 1993

24011.03



#### LEGEND

- APPROXIMATE LANDFILL BOUNDARY
- DASHED PORTIONS INDICATE THE SURVEY GRID BOUNDARY
- PROPERTY BOUNDARY
- PAVED ROAD
- INTERMITTENT STREAM
- RAILROAD TRACK
- MONITORING WELL LOCATION
- ISOLATE WELL LOCATION
- STAFF GAUGE LOCATION
- ARSENIC ISOCONCENTRATION CONTOUR (ug/L)
- FENCE LINE

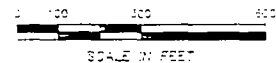


FIGURE 4  
ARSENIC  
ISOCONCENTRATION MAP  
SHALLOW BEDROCK

REGION-SHERIDAN TOWNSHIP LANDFILL  
ALBION, MICHIGAN

MARCH, 1995

14011.03

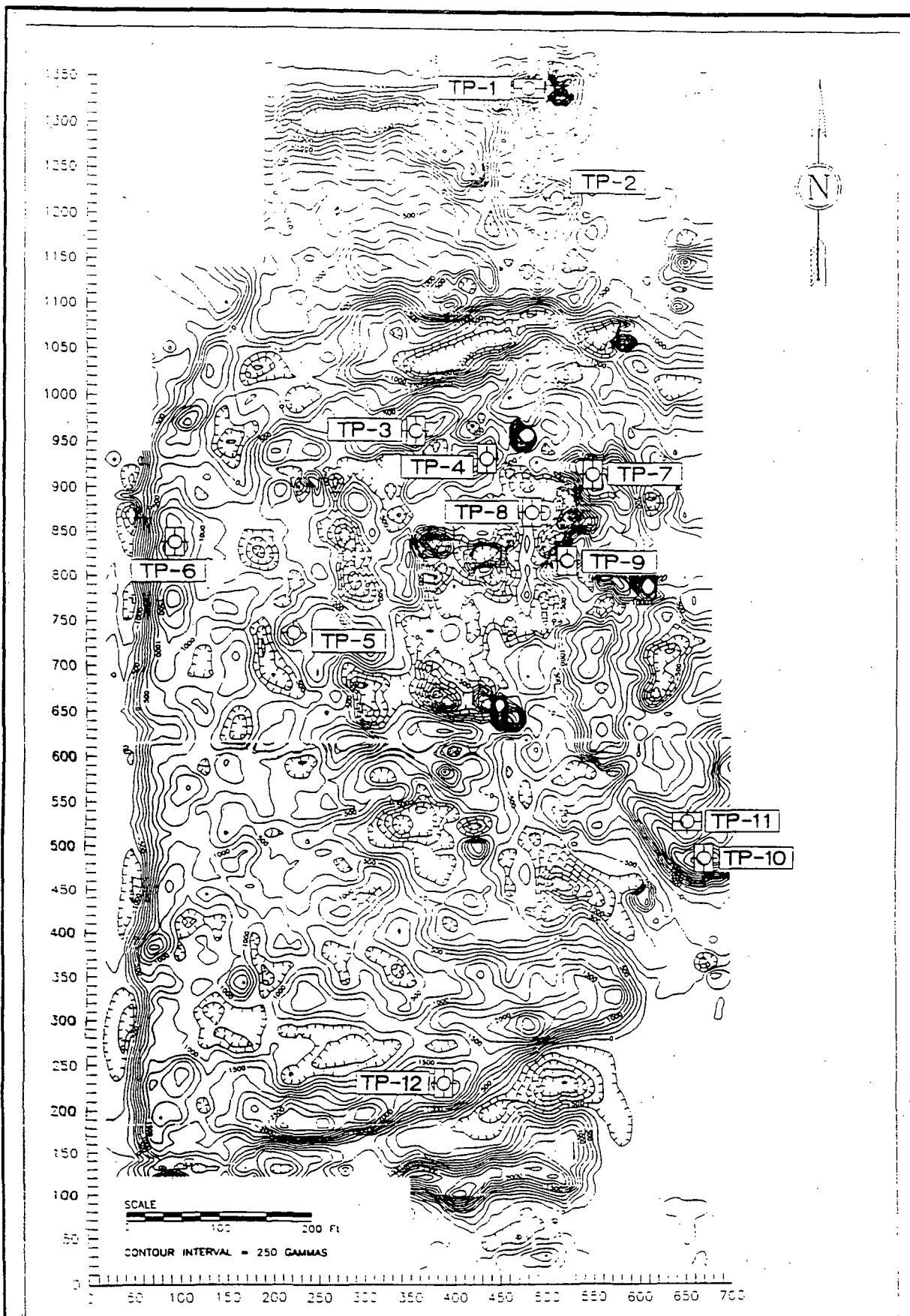
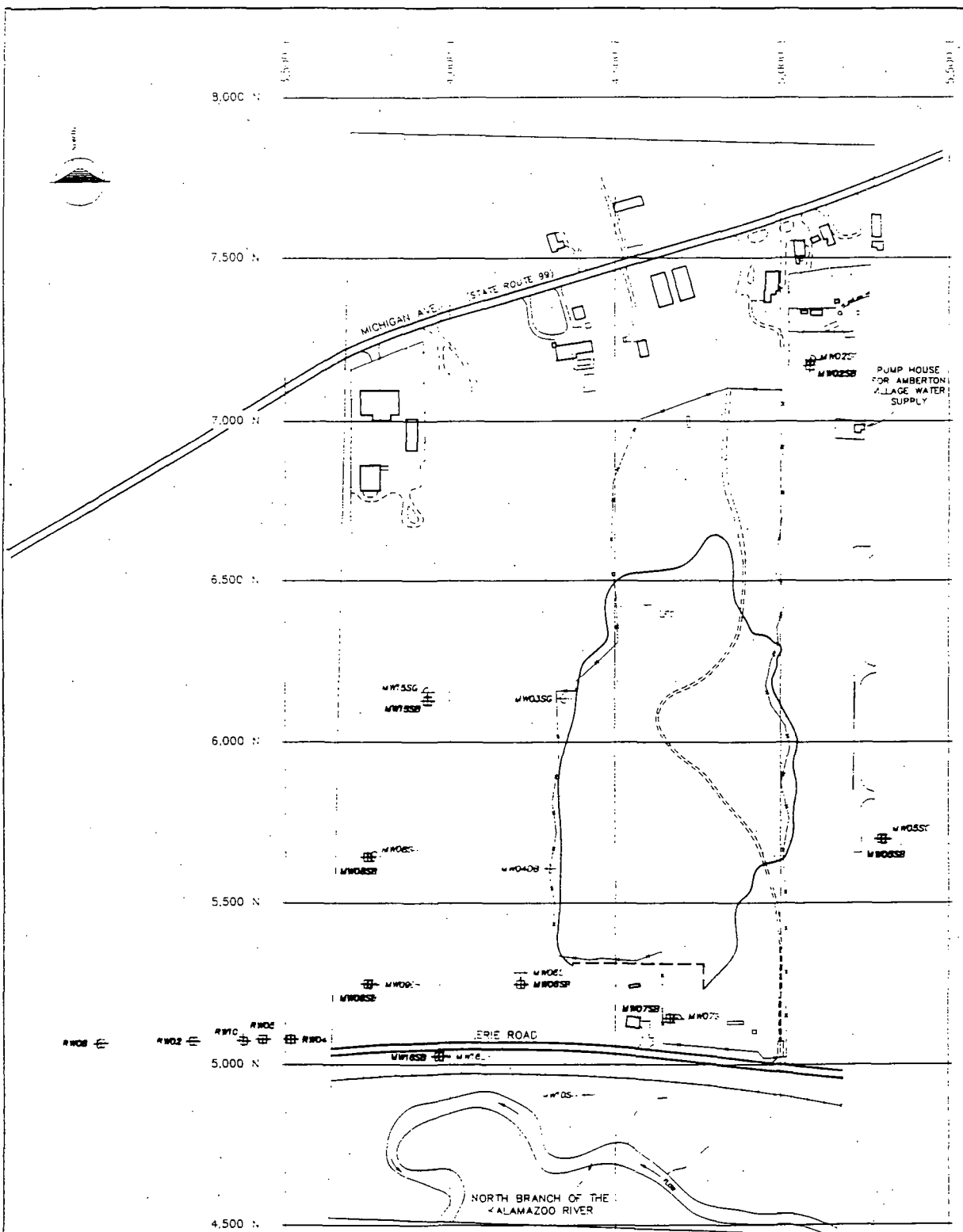


FIGURE 5  
TEST PIT LOCATIONS  
ALBION-SHERIDAN LANDFILL  
ALBION, MICHIGAN

SOURCE: Michigan Department of Natural Resources, Geological Services Section  
Regional Magnetic Contour Map, December 1993

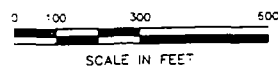
ABB Environmental Services, Inc.



# LEGEND

- - APPROXIMATE LANDFILL BOUNDARY (DASHED PORTIONS INDICATE THE SURVEY GRID BOUNDARY)
- ===== - UNPAVED ROAD
- - INTERMITTENT STREAM
- - FENCE LINE
- - RAILROAD TRACK
- - MONITORING WELL LOCATION SAMPLED ANNUALLY
- == - MONITORING WELL LOCATION SAMPLED QUARTERLY

FIGURE 6



ALB-LTW  
LVP080494

## LONG TERM MONITORING WELL LOCATION MAP

ALBION-SHERIDAN TOWNSHIP LANDFILL  
ALBION, MICHIGAN

1 AUGUST, 1994

04011.05



TABLE 1

**Chemicals of Potential Concern**  
**Albion-Sheridan Township Landfill, Albion, Michigan**

<b>Surface Soils</b>		
Benzo(a)anthracene	Di-n-butyl phthalate	Barium
Benzo(b)fluoranthene	Fluoranthene	Chromium
Benzo(k)fluoranthene	Indeno(1,2,3-cd)pyrene	Copper
Benzo(ghi)perylene	Phenanthrene	Cyanide
Benzo(a)pyrene	Pyrene	Vanadium
Chrysene	Arsenic	Zinc
Dibenz(a,h)anthracene		

<b>Ground Water Monitoring Wells - Unconsolidated Sediment and Bedrock Aquifers</b>		
Benzene	Endosulfan sulfate	Cobalt
Carbon disulfide	Lindane	Iron
1,2-Dibromo-3-chloropropane	Antimony	Nickel
Vinyl chloride	Arsenic	Selenium
Xylene, total	Barium	Thallium
Bis(2-ethyl hexyl)phthalate	Cadmium	Zinc

<b>Residential Wells</b>		
Heptachlor	Selenium	

<b>Surface Water</b>		
Carbon disulfide	Butyl benzyl phthalate	Diethyl phthalate

<b>River Sediments</b>		
Acetone	Pyrene	Cadmium
Methylene chloride	b-BHC	Chromium
Bis(2-ethyl hexyl)phthalate	b-Endosulfan	Cyanide
Fluoranthene	Endrin	Thallium
Phenanthrene	Endrin aldehyde	

**Chemicals of Potential Concern**  
**Albion-Sheridan Township Landfill, Albion, Michigan**

Wetland Sediments		
Acetone	4,4'-DDT	Heptachlor
Methylene chloride	b-Endosulfan	Methoxychlor
Bis(2-ethyl hexyl)phthalate	Endrin	Arsenic
2-Methylnaphthalene	Endrin aldehyde	Mercury
Phenanthrene	Endrin ketone	Selenium

Table 2. Maximum Risks from Combined Ingestion and  
Dermal Contact Pathways for Various Media

<u>Media</u>	<u>Maximum Hazard Index</u>	<u>Maximum Carcinogenic Risk</u>
Groundwater	54	$2.1 \times 10^{-3}$
Off-site soils	0.18	$2.6 \times 10^{-5}$
Surface water	0.11	0
Sediments	0.048	$1.9 \times 10^{-6}$

Table 3. Cost Summary for Remedial Alternatives

<u>Alternative</u>	<u>Capital Cost</u>	<u>O&amp;M</u>	<u>Present Value</u>
2 - Drum Removal	\$ 614,581	-0-	\$ 614,581
3A - Clay Cap	\$ 1,542,609	\$ 109,373 <sup>1</sup>	\$ 1,651,982
3B - Enhanced Clay Cap	\$ 1,779,137	\$ 109,373 <sup>1</sup>	\$ 1,888,510
3C - FML Cap	\$ 1,728,431	\$ 109,373 <sup>1</sup>	\$ 1,837,804
4A - Passive Venting of Landfill Gas	\$ 49,600	\$ 207,777 <sup>1</sup>	\$ 257,377
4B - Active Collection of Landfill Gas	\$ 182,900	\$ 446,093 <sup>1</sup>	\$ 628,993
5A - Groundwater Monitoring (GWM)	\$ 128,822	\$ 642,335 <sup>2</sup>	\$ 771,157
5B - In-situ Treatment to MCL + GWM	\$ 560,284	\$ 790,457 <sup>3</sup>	\$ 1,350,741
5C - In-situ Treatment to Type B + GWM	\$ 862,656	\$ 1,539,827 <sup>4</sup>	\$ 2,402,483
5D - Pump & Treat + GWM	\$ 931,703	\$ 1,280,281 <sup>5</sup>	\$ 2,221,984

<sup>1</sup> Includes 30 yrs

<sup>2</sup> Includes 20 yrs of GWM (5 yrs beyond expected attainment of MCLs)

<sup>3</sup> Includes 5 years of in-situ treatment (during yrs 6 through 10, as called for in the contingent remedy) and 5 additional yrs of GWM during yrs 11 through 15

<sup>4</sup> Includes 12 yrs of in-situ treatment and 5 additional yrs of GWM

<sup>5</sup> Includes 9 yrs of pump and treat and 5 additional yrs of GWM

TABLE 4

## Evaluation Table

	No Action	Drums	Landfill Cap Options			Landfill Gas Options		Ground-water Options			
EVALUATION CRITERION	1	2	3A	3B	3C	4A	4B	5A	5B	5C	5D
1. Overall Protection of Health & Environment	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2. Will comply with all ARARs	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3. Long-term Effectiveness and Permanence	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4. Reduction of Toxicity, Mobility, or Volume through Treatment	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5. Short-term Effectiveness	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
6. Implementability	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
7. Estimated Cost	\$0	\$0.6 million	\$1.7 million	\$1.9 million	\$1.9 million	\$0.3 million	\$0.7 million	\$1.1 million	\$1.8 million	\$2.8 million	\$2.7 million
8. State Agency Acceptance	State acceptance of the recommended alternative will be evaluated after the public comment period.										
9. Community Acceptance	Community acceptance of the recommended alternative will be evaluated after the public comment period.										

☒ = fully meets

☒ = partly meets

☐ = does not meet

Telephone (312) 544-3200  
FAX (312) 544-8587

# SUBURBAN LABORATORIES, Inc.

4140 LITT DRIVE

HILLSIDE, ILLINOIS 60162 • 1183

EARL I. ROSENBERG  
President

H.R. THOMAS, JR.  
Director

August 23, 1989

Roy F. Weston, Inc./Sper Division  
111 North Canal Street, Suite #855  
Chicago, Illinois 60606

Attention: Ms. Maureen O'Mara  
Environmental Chemist

Re: Project #89WT02Sample Received: 8/17/89

*ALBION-SHERIDAN Township LANDFILL*  
*ALBION, MICHIGAN*

Source: S/L #9-9151 - Drum #1, Grab Sample, 11:30, 8/15/89 S-18  
EPA #5-C45337

			E. P. Toxicity (mg/l)	
Cyanide-Total	(ppm)	5.72	Arsenic	< 0.10
Cyanide-Reactive		-	Barium	< 0.10
Flash Point		> 212°F	Cadmium	< 0.10
Sulfide-Total	(ppm)	2.90	Chrom-Total	< 0.10
Sulfide-Reactive		-	Lead	< 0.10
pH (1:3 dilution)		6.40	Mercury	0.0003
THIS SAMPLE WAS COLLECTED FROM A DRUM MARKED "B-1" THE MARKING IS IN ORANGE PAINT.			Selenium	< 0.10
			Silver	< 0.10

&lt; = less than

&gt; = greater than

DRUMS MARKED B-2, B-3,  
AND B-4 ARE ADJACENT  
TO DRUM B-1

ANALYSIS CERTIFIED BY:

Director (HRT/ck)

Members of American Society of Mass Spectrometry • American Chemical Society • American Society for Microbiology  
Water Pollution Control Federation • Institute of Food Technology • Certifications: U.S.D.A. #1783 • Ill. Dept. of Public Health #17136  
Amer. Spice Trade Assn. • F.D.A. Reg. #1419678 • Ill. EPA #100225 • Wis. DNR #999318210

Telephone (312) 544-3260  
FAX (312) 544-8887

# SUBURBAN LABORATORIES, Inc.

4140 LITT DRIVE

HILLSIDE, ILLINOIS 60162 - 1183

EARL I. ROSENBERG  
President

H.R. THOMAS, JR.  
Director

August 23, 1989

RECEIVED

AUG 24 1989

LAT REG M

Roy F. Weston, Inc./Sper Division  
111 North Canal Street, Suite #855  
Chicago, Illinois 60606

Attention: Ms. Maureen O'Mara  
Environmental Chemist

Re: Project #89WT02

ALBION-SHERIDAN TOWNSHIP LANDFILL  
ALBION, MICHIGAN

Sample Received: 8/17/89

Source: S/L #9-9152 - Drum #2, Grab Sample, 8/15/89 S-19, 15:45  
EPA #5-C45338

			E. P. Toxicity (mg/l)
Cyanide-Total	(ppm)	< 0.02	Arsenic < 0.10
Cyanide-Reactive		-	Barium 0.21
Flash Point		> 212°F	Cadmium < 0.10
Sulfide-Total	(ppm)	0.94	Chrom-Total < 0.10
Sulfide-Reactive		-	Lead < 0.10
pH (1:3 dilution)		7.64	Mercury 0.0002
THIS SAMPLE WAS COLLECTED			Selenium < 0.10
FROM A DRUM MARKED "B-26"			Silver < 0.10
THE MARKING IS IN ORANGE PAINT.			

DRUMS MARKED B-24 + B-25 < = less than  
ARE ADJACENT TO DRUM B-26 > = greater than

ANALYSIS CERTIFIED BY:

Director (HRT/ck)

Members of American Society of Mass Spectrometry • American Chemical Society • American Society for Microbiology  
Water Pollution Control Federation • Institute of Food Technology • Certifications: U.S.D.A. #1783 • Ill. Dept. of Public Health #17135  
Amer. Spice Trade Assn. • F.D.A. Reg. #1419878 • Ill. EPA #100225 • Wis. DNR #999318210

# SUBURBAN LABORATORIES, Inc.

4140 LITT DRIVE

HILLSDALE, ILLINOIS 60162 • 1183

EARL I. ROSENBERG  
President

H.R. THOMAS, JR.  
Director

August 23, 1989

Roy F. Weston, Inc./Sper Division  
111 North Canal Street, Suite #555  
Chicago, Illinois 60606

Attention: Ms. Maureen O'Mara  
Environmental Chemist

Re: Project #89WT02

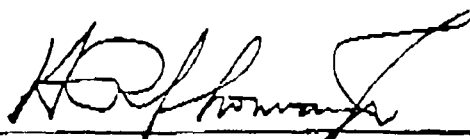
Sample Received: 8/17/89

*ALBION-SHERIDAN TOWNSHIP LANDFILL  
ALBION, MICHIGAN*

Source: S/L #9-9153 - Sludge Sample, 17:00, 8/15/89, S-20  
EPA #3-043339

			E. P. Toxicity (mg/l)
Cyanide-Total	(ppm)	< 0.02	Arsenic < 0.10
Cyanide-Reactive	-	-	Barium < 0.10
Flash Point	> 212°F	-	Cadmium < 0.10
Sulfide-Total	(ppm)	3.24	Chrom-Total < 0.10
Sulfide-Reactive	-	-	Lead < 0.10
pH (1:3 dilution)		7.43	Mercury < 0.0001
THIS SAMPLE WAS COLLECTED FROM THE GROUND SURFACE ADJACENT TO THE DRUM MARKED "B-1"			Selenium < 0.10
			Silver < 0.10
			< = less than
			> = greater than

ANALYSIS CERTIFIED BY:



Director (HRT/ck)

## ENVIRONMENTAL ENGINEER

## SUMMARY SHEET

TELECOPIER (313) 758-1129

**great lakes  
environmental  
services, inc.**

DATE \_\_\_\_\_

6-14-90

COMPOSITE

DRUM 2' 3

44-

SAMPLE 1

LAB REQUEST. POSSIBLE DISPAL P/N

[illegible]

? /N=NON PUMPABLE

Eagle Pitches  
GENERATOR Albion-Sheridan Twp

LAB WORK-UP

DATE 6/14/90

JOB# 20-6206

PAGE 1 OF 2

DRUM #	MATERIAL DESCRIPTION	ANALYTICAL COMPOSITE		ADDITIONAL NOTES
		PH, FLASH OTHER	#	
B1	Grease	no flash	2	
B2	clear liquid with debris	no flash	3	strong gas smell
B3	clear liquid with debris	no flash	3	
B4	clear liquid with tan skin	no flash	3	
B7	clear liquid with debris	no flash, pH=7	3	probably rain water
B8 → B9	Green paint	flash	1	
B10	green paint	flash	1	
B11	Grease	no flash	2	
B12	Grease	no flash	2	
B13	viscous orange liquid	flash pH=6	1	
B14	Orange paint	flash	1	
B15	Grease	no flash	2	
B16	Blue paint	flash	1	
B17	Yellow paint	flash	1	2 phase
B18	clear liquid brown viscous liquid		1	
B22	Water & Plastic Bags/debris		5	
B24	Flakes of brown solids & water	pH=6	6	
B26	Flakes of brown solids		6	
A1	tan viscous substance	pH=7	4	2 phase, thin liquid (solvent?), red flame
A2	thin dark liquid	pH=9 no flash	4	solvent odor

GREAT LAKES  
ENVIRONMENTAL SERVICE

GENERATOR Eagle-Pitcher  
Albion-Sheridan Twp

DATE 6/14/90

PAGE 2 OF 2

DRUM #	MATERIAL DESCRIPTION	PH, FLASH OTHER	ADDITIONAL NOTES
--------	----------------------	-----------------	------------------

A3	dark tan viscous substance	pH=6	4	2 phase, solvent, <sup>yellow</sup> flame
A4	Grease	no flash pH=	2	
Tank		no flash	<del>2</del> 1	Rinse water, Gtri Klean & Gasoline Residue
B8	Solidified material dried paint		1	
B190	tan viscous substance	pH=6	4	2 phase

GREAT LAKES  
ENVIRONMENTAL SERVICE

Eagle Pitcher

## DRUM SAMPLING

GENERATOR Albion-Sheridan TwpDATE 6/11/90JOB # 20-6206PAGE 1 OF 2

DRUM#	DESCRIPTION	OVER					QUANTITY	P/N
		L/S	PAK	TOP	RING	BUNG		
B1	Black sludge		X	X			55gal	N
B2	Hole in vent		X				55gal	P
B3	Missing vent		X				55gal	P
B4	dented, missing vent		X				55gal	P
B5	Empty, laying sideways, <sup>rusty</sup> bullet holes					X	55gal	N
B6	dented, upside down, empty						30gal	-
B7	cut in half, oil residue		X	X	X		55gal	-
B8	pressurized, sideways empty						30gal	N
B9	sideways, <sup>solidified material</sup> seeping through bung hole		X				55gal	N
B10	<sup>rusty top</sup> solidified material seeping through		X				55gal	N
B11	<sup>partially buried</sup> oily material seeped through top		X				55gal	N
B12	seeping material, partially buried		X				55gal	N
B13	sideways (semi-buried)		X				55gal	N
B14	sideways		X				55gal	N
B15	sideways		X				55gal	N
B16	sideways, leaking blue paint <sup>bung hole</sup> through		X				55gal	N
B17	leaking yellow paint through bullet hole		X				55gal	N
B18	rusty, solidified material leaking out		X				55gal	N
B19	empty							-
B20	empty, crushed							-
B21	bottom rusted, empty							-
B22	open top, filled with trash		X					N
B23	missing							-
B24	open top, rusting off		X	X				N

GREAT LAKES  
ENVIRONMENTAL SERVICE





# GRACE ANALYTICAL LAB, INC.

5300-B McDermott Drive  
Berkeley, Illinois 60163  
(312) 449-9449

November 1, 1989

Ms. Sally Matz  
Roy F. Weston  
111 E. North Canal Street  
Suite 855  
Chicago, IL 60606

Dear Ms. Matz:

I am enclosing the data sheets for the project number,  
90WT01. The samples are identified as follows:

Sample I.D. No.	File Ref. No.	
S-61	9V816	RCRA Characteristics
S-62		"
S-63		"
S-64		"

If you have any questions, please call me.

Sincerely,

*Steven Kim*

Steven Kim, Ph.D.  
Lab Director

SK:gk

enclosures

ALBION - Sheraton LF I  
ALBION, MI  
ROSS POWERS

RECEIVED

NOV 1 1989

SM



GRADE ANALYTICAL LAB, INC.  
5300-8 McDERMOTT DRIVE, BERKELEY, ILLINOIS 60163

1 OF 1

F001 - F009 SOLVENT WASTES ANALYSIS DATA SHEET  
=====

STUDY NAME: WESTON/90WT01

STUDY NO: GAL-891017

LAB SAMPLE I.D. NO: S-61

FILE REF. NO: >9V816

CAS #	COMPOUND	AMOUNT (ug/kg)
1. 67-64-1	ACETONE	75 U
2. 71-36-3	N-BUTYL ALCOHOL	50 U
3. 75-15-0	CARBON DISULFIDE	3.0 U
4. 56-23-5	CARBON TETRACHLORIDE	1.5 U
5. 108-90-7	CHLOROBENZENE	1.5 U
6. 108-39-4	M-CRESOL	10 U
7. 106-44-5	P-CRESOL	10 U
8. 95-48-7	O-CRESOL	10 U
9. 108-94-1	CYCLOHEXANONE	90 U
10. 95-50-1	1,2-DICHLOROBENZENE	1.5 U
11. 141-78-6	ETHYL ACETATE	90 U
12. 100-41-4	ETHYLBENZENE	31.2
13. 60-29-7	ETHYL ETHER	75 U
14. 78-93-1	ISOBUTANOL	50 U
15. 67-56-1	METHANOL	50 U
16. 75-09-2	METHYLENE CHLORIDE	1.0 U
17. 78-93-3	METHYL ETHYL KETONE	50 U
18. 108-10-1	METHYL ISOBUTYL KETONE	3.0 U
9. 98-95-3	NITROBENZENE	1.5 U
20. 110-86-1	PYRIDINE	1.5 U
21. 127-18-4	TETRACHLOROETHYLENE	6.00
22. 108-88-3	TOLUENE	17.0
23. 71-55-6	1,1,1-TRICHLOROETHANE	17.5
24. 76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	1.5 U
25. 79-01-6	TRICHLOROETHYLENE	1.5 U
26. 75-69-4	TRICHLOROFLUOROMETHANE	1.5 U
27. 1330-20-7	XYLENE (total)	319

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT FOR REAGENT WATER.  
J - ESTIMATED VALUE.  
SLC - SUSPECTED LABORATORY CONTAMINANT.  
SFC - SUSPECTED FIELD CONTAMINANT.

GRACE ANALYTICAL LABORATORY  
5300-B MCDERMOTT DRIVE  
BERKELEY, ILLINOIS 60163

312/449-9449

VOLATILE  
ORGANICS ANALYSIS DATA SHEET  
=====

STUDY NAME: WESTON/90WT01

STUDY NO: GAL-891017

SAMPLE I.D. NO: S-61

FILE REF. NO: >90816

TENTATIVELY  
IDENTIFIED COMPOUNDS  
=====

ESTIMATED AMOUNT  
(UG/KG)  
=====

Hexane, 3-ethyl-4-methyl-	1950
Pentalene, octahydro-2-methyl-	1160
Cyclohexane, propyl-	1880
Nonane, 4-methyl-	1300
2-Octene, 2,6-dimethyl-	1940
Benzene, 1-ethyl-2-methyl-	2540
Benzene, 1,2,3-trimethyl-	3920
Octane, 2,7-dimethyl-	7740
Benzene, (1-methylethyl)-	1350
Benzene, 1-ethyl-3-methyl-	3870
Nonane, 2,6-dimethyl-	2110
Benzene, 1-ethyl-4-methyl-	2260
Nonane, 3,7-dimethyl-	1000
Naphthalene, decahydro-, trans-	2850
Benzene, 1-methyl-3-propyl-	1270
Benzene, 1-ethyl-2,3-dimethyl-	1610
Cyclohexane, 1,2-diethyl-1-methyl-	2220
Undecane	6040
Benzene, (1,1-dimethylpropyl)-	1250
Cyclohexane, pentyl-	1500
Benzene, 1,2,3,4-tetramethyl-	1080
Benzene, methyl-(1-methylethyl)-	1130
Dodecane	1120

GRACE ANALYTICAL LAB, INC.  
5300-B MCDERMOTT DRIVE, BERKELEY, ILLINOIS 60163

1 OF 1

F001 - F005 SOLVENT WASTES ANALYSIS DATA SHEET  
=====

STUDY NAME: WESTON/90WT01

STUDY NO: GAL-891017

LAB SAMPLE I.D. NO: Lab Blank

FILE REF. NO: >90813

CAS #	COMPOUND	AMOUNT (ug/kg)
1. 67-64-1	ACETONE	75 U
2. 71-36-3	N-BUTYL ALCOHOL	50 U
3. 75-15-0	CARBON DISULFIDE	3.0 U
4. 56-23-5	CARBON TETRACHLORIDE	1.5 U
5. 108-90-7	CHLOROBENZENE	1.5 U
6. 108-39-4	M-CRESOL	10 U
7. 106-44-5	P-CRESOL	10 U
8. 95-48-7	O-CRESOL	10 U
9. 108-94-1	CYCLOHEXANONE	50 U
10. 95-50-1	1,2-DICHLOROBENZENE	1.5 U
11. 141-78-6	ETHYL ACETATE	50 U
12. 100-41-4	ETHYLBENZENE	1.5 U
13. 60-29-7	ETHYL ETHER	75 U
14. 78-83-1	ISOBUTANOL	50 U
15. 67-56-1	METHANOL	50 U
16. 75-09-2	METHYLENE CHLORIDE	1.0 U
17. 78-93-3	METHYL ETHYL KETONE	50 U
8. 108-10-1	METHYL ISOBUTYL KETONE	3.0 U
19. 98-95-3	NITROBENZENE	1.5 U
20. 110-86-1	PYRIDINE	1.5 U
21. 127-18-4	TETRACHLOROETHYLENE	1.5 U
22. 108-88-3	TOLUENE	1.5 U
23. 71-55-6	1,1,1-TRICHLOROETHANE	1.5 U
24. 76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	1.5 U
25. 79-01-6	TRICHLOROETHYLENE	1.5 U
26. 75-69-4	TRICHLOROFLUOROMETHANE	1.5 U
27. 1330-20-7	XYLENE (total)	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT FOR REAGENT WATER.  
J - ESTIMATED VALUE.  
SLC - SUSPECTED LABORATORY CONTAMINANT.  
SFC - SUSPECTED FIELD CONTAMINANT.

1 OF 1

STUDY NO: GAL-891017

[illegible]

GRACE ANALYTICAL LABORATORY, INC.  
5300-B McDERMOTT DRIVE, BERKELEY, IL 60163

INORGANIC ANALYSIS QA/QC REPORT  
=====

STUDY NAME: WESTON/90WT01

STUDY NO: GAL-891017

	S-61	S-62	S-63	S-64
PH	8.5	6.6	6.5	6.0
FLASH POINT	>212	<75	<75	<75
CYANIDE TOTAL	<10 MG/KG	<10 MG/KG	<10 MG/KG	<10 MG/KG
AMENABLE	<10 MG/KG	<10 MG/KG	<10 MG/KG	<10 MG/KG
SULFIDE TOTAL	<10 MG/KG	<10 MG/KG	<10 MG/KG	<10 MG/KG
REACTIVE	<10 MG/KG	<10 MG/KG	<10 MG/KG	<10 MG/KG

DUE TO EMULSION, SAMPLE WAS DILUTED TEN TIMES FOR CYANIDE AND  
SULFIDE.

GRACE ANALYTICAL LABORATORY, INC.  
5300-B MODERMOTT DRIVE, BEREKELEY, ILLINOIS 60163

QA/QC REPORT FOR INORGANIC ANALYSIS  
=====

STUDY NAME: WESTON/90WT01

STUDY NO: GAL-891017

TEST	BLANK	SAMPLE S-64 (SR)	DUP SAMPLE S-64	REL. % DIF (RPD)	SPIKE ADDED (SA)	SPIKE REC. (SSR)	% REC.
CYANIDE	<0.1	<10	<10	0	0.50	0.33	66*
SULFIDE	<0.1	<10	<10	0	0.50	0.41	82

RESULTS ARE IN MG/KG

RPD = DIFFERENCE OF SAMPLE & DUPLICATE / MEAN X 100

% REC = [(SSR-SR)/SA] x 100

\* MATRIX INTERFERENCE

TECHNICAL ASSISTANCE TEAM, REGION V  
CINCINNATI TAT  
WESTON - MAJOR PROGRAMS DIVISION  
33 TRIANGLE PARK DRIVE  
CINCINNATI, OHIO 45246

## FACSIMILE TRANSMITTAL SHEET

TO: JASON EL-ZIEN - OSC PHONE: \_\_\_\_\_REGION OR AGENCY: U.S. EPA GROSSE ILE, MICHIGANMACHINE PHONE NUMBER: (313) 692-7677SUBJECT: ALBION-SHERIDAN TOWNSHIP LANDFILL  
ALBION, MICHIGANFROM: JERRY BOECKMAN PHONE: (513) 772-3444DATE: APRIL 24, 1990PAGES TO FOLLOW (excluding cover sheet): three (3)

FOR ASSISTANCE AND/OR VERIFICATION, CALL: 513-772-3444

CINCINNATI TAT FACSIMILE MACHINE NUMBER: 1-513-772-3452

## ADDITIONAL COMMENTS:

Jason: Review the attached analytical data from the sampling done on 08/15/89. I have indicated the corresponding drums + soil that we marked. The person who collected all three samples on 08/15/89 was Rick Mehl of the Chicago WESTON TAT office.

Please call me, if I can offer help.

Jerry Boeckman

Telephone (312) 544-3260  
FAX (312) 544-8587

## SUBURBAN LABORATORIES, Inc.

4140 LITT DRIVE

HILLSIDE, ILLINOIS 60182 • 1183

EARL I. ROSENBERG  
PresidentH.R. THOMAS, JR.  
Director

August 23, 1989

Roy F. Weston, Inc./Sper Division  
111 North Canal Street, Suite #855  
Chicago, Illinois 60606Attention: Ms. Maureen O'Mara  
Environmental ChemistRe: Project #89WT02Sample Received: 8/17/89*ALBION-SHERIDAN Township LANDFILL*Source: S/L #9-9151 - Drum #1 Grab Sample, 11:30, 8/15/89 S-18  
EPA #5-045337

			E. P. Toxicity (mg/l)	
Cyanide-Total	(ppm)	5.72	Arsenic	< 0.10
Cyanide-Reactive		-	Barium	< 0.10
Flash Point		> 212°F	Cadmium	< 0.10
Sulfide-Total	(ppm)	2.90	Chrom-Total	< 0.10
Sulfide-Reactive		-	Lead	< 0.10
pH (1:3 dilution)		6.40	Mercury	0.0003
			Selenium	< 0.10
			Silver	< 0.10

THIS SAMPLE WAS  
COLLECTED FROM A  
DRUM MARKED "B-1"  
THE MARKING IS IN ORANGE PAINT.

< = less than  
> = greater than

DRUMS MARKED B-2, B-3,  
AND B-4 ARE ADJACENT  
TO DRUM B-1

ANALYSIS CERTIFIED BY:

Director (HRT/ck)

Members of American Society of Mass Spectrometry • American Chemical Society • American Society for Microbiology  
Water Pollution Control Federation • Institute of Food Technology • Certifications: U.S.D.A. #1783 • Ill. Dept. of Public Health #17136  
Amer. Spice Trade Assn. • F.D.A. Reg. #1419878 • Ill. EPA #100225 • Wis. DNR #889318210

Telephone (312) 544-3260  
FAX (312) 544-8887

## SUBURBAN LABORATORIES, Inc.

4140 LITT DRIVE

HILLSDALE, ILLINOIS 60162 - 1183

EARL I. ROSENBERG  
PresidentH.R. THOMAS, JR.  
Director

August 23, 1989

RECEIVED

AUG 24 1989

JAT REG M

Roy F. Weston, Inc./Sper Division  
111 North Canal Street, Suite #855  
Chicago, Illinois 60606Attention: Ms. Maureen O'Mara  
Environmental ChemistRe: Project #89WT02

ALBION-SHERIDAN TOWNSHIP LANDFILL

Sample Received: 8/17/89Source: S/L #9-9152 - Drum #2, Grab Sample, 8/15/89, S-19, 16:45  
EPA #5-045338

			E. P. Toxicity (mg/l)	
Cyanide-Total	(ppm)	< 0.02	Arsenic	< 0.10
Cyanide-Reactive		-	Barium	0.21
Flash Point		> 212°F	Cadmium	< 0.10
Sulfide-Total	(ppm)	0.94	Chrom-Total	< 0.10
Sulfide-Reactive		-	Lead	< 0.10
pH (1:3 dilution)		7.64	Mercury	0.0002
			Selenium	< 0.10
			Silver	< 0.10

THIS SAMPLE WAS COLLECTED  
FROM A DRUM MARKED "B-26"  
THE MARKING IS IN ORANGE PAINT.DRUMS MARKED B-24 + B-25 < = less than  
ARE ADJACENT TO DRUM B-26 > = greater than

ANALYSIS CERTIFIED BY:



Director (HRT/ck)

Members of American Society of Mass Spectrometry • American Chemical Society • American Society for Microbiology  
Water Pollution Control Federation • Institute of Food Technology • Certifications: U.S.D.A. #1753 • Ill. Dept. of Public Health #17135  
Amer. Spice Trade Assn. • F.D.A. Reg. #1419878 • Ill. EPA #100225 • Wis. DNR #999318210

Telephone (312) 544-3260  
FAX (312) 544-8587

## SUBURBAN LABORATORIES, Inc.

4140 LITT DRIVE

HILLSIDE, ILLINOIS 60162 - 1183

EARL I. ROSENBERG  
PresidentH.R. THOMAS, JR.  
Director

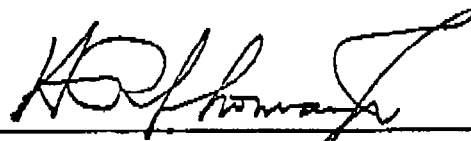
August 23, 1989

Roy F. Weston, Inc./Sper Division  
111 North Canal Street, Suite #855  
Chicago, Illinois 60606Attention: Ms. Maureen O'Mara  
Environmental ChemistRe: Project #89WT02*ALBION-SHERIDAN TOWNSHIP LANDFILL*Sample Received: 8/17/89Source: S/L #9-9153 - Sludge Sample, 17:00, 8/15/89, S-20  
EPA #3-043339

			<u>E. P. Toxicity</u> <u>(mg/l)</u>
Cyanide-Total	(ppm)	< 0.02	Arsenic < 0.10
Cyanide-Reactive		-	Barium < 0.10
Flash Point		> 212°F	Cadmium < 0.10
Sulfide-Total	(ppm)	3.24	Chrom-Total < 0.10
Sulfide-Reactive		-	Lead < 0.10
pH (1:3 dilution)		7.43	Mercury < 0.0001
			Selenium < 0.10
			Silver < 0.10

THIS SAMPLE WAS  
COLLECTED FROM THE  
GROUND SURFACE  
ADJACENT TO THE  
DRUM MARKED "B-1"< = less than  
> = greater than

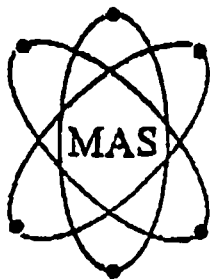
ANALYSIS CERTIFIED BY:



Director (HRT/ck)

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P.2/8



# Midwest Analytical Services, Inc.

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2727 Second Avenue  
Detroit, Michigan 48201

Phone: (313) 964-36  
FAX No.: (313) 964-23

DATE: 6/26/90

ATTENTION: MRS. SUE O'MARA  
GREAT LAKES ENVIRONMENTAL SERVICES INC.  
22077 MOUND RD, P.O. BOX 1208, WARREN MI. 48901-1208

SAMPLE IDENTIFICATION: PAINT WG 10212 EAGLE PITCHER/SILAS TANK

MAS PROJECT NUMBER (S): 9038

PHYSICAL DESCRIPTION: MULTICOLOR SOLID

STARTED: 6/18/90 COMPLETED: 6/25/90

SAMPLE PREP: THE SAMPLE WAS ANALYZED " TCLP "

DATA: ALL METHODS ARE FOUND IN EPA SWS 846 A-C

	SAMPLE RESULT	EPA LIMIT
IGNITIBILITY (1010)	85 F	< 140 F
pH VALUE (9040)	4.45	< 2.0 or > 12.5
REACTIVITY:		
REACTIVE CYANIDE	< 1 ppm	250 ppm
REACTIVE SULFIDE	< 10 ppm	500 ppm

TCLP METALS: (ppm)		
ARSENIC (7060)	< 0.05	5.0
BARIUM (7080)	< 0.5	100
CADMIUM (7130)	< 0.1	1.0
CHROMIUM TOTAL (7190)	< 0.1	5.0
LEAD (7420)	16	5.0
MERCURY (7470)	< 0.05	0.2
NICKEL (7520)	< 0.1	---
SELENIUM (7740)	< 0.05	1.0
SILVER (7760)	< 0.1	5.0
THALLIUM (7840)	< 0.5	---
COPPER (7210)	< 0.1	100 DNR
ZINC (7950)	1.7	500 DNR

ANALYSES PERFORMED BY: KEVIN J. O'MARA and RICHARD A. KERN

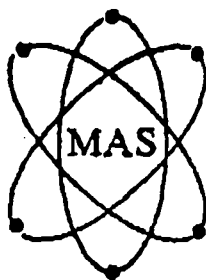
*Kevin J. O'Mara*

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P.3.8



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FAX No.: (313) 964-2

DATE: 6/26/90

ATTENTION: MRS. SUE O'MARA  
GREAT LAKES ENVIRONMENTAL SERVICES INC.  
22077 MOUND RD, P.O. BOX 1208, WARREN MI. 48901-1208

SAMPLE IDENTIFICATION: GREASE WG 10213 EAGLE PITCHER/SILAS TANK

MAS PROJECT NUMBER (S): 9039

PHYSICAL DESCRIPTION: BLACK SOLID

STARTED: 6/18/90 COMPLETED: 6/25/90

SAMPLE PREP: THE SAMPLE WAS ANALYZED " TCLP "

DATA: ALL METHODS ARE FOUND IN EPA SWS 846 A-C

	SAMPLE RESULT	EPA LIMIT
IGNITIBILITY (1010)	> 200 F	< 140 F
pH VALUE (9040)	5.27	< 2.0 or > 12.5
REACTIVITY:		
REACTIVE CYANIDE	< 1 ppm	250 ppm
REACTIVE SULFIDE	< 10 ppm	500 ppm
TOTAL PCB (8080)	< 1 ppm	50 ppm
TCLP METALS: (ppm)		
ARSENIC (7060)	< 0.05	5.0
BARIUM (7080)	< 0.5	100
CADMIUM (7130)	< 0.1	1.0
CHROMIUM TOTAL (7190)	< 0.1	5.0
LEAD (7420)	< 0.1	5.0
MERCURY (7470)	< 0.05	0.2
NICKEL (7520)	< 0.1	---
SELENIUM (7740)	< 0.05	1.0
SILVER (7760)	< 0.1	5.0
THALLIUM (7840)	< 0.5	---
COPPER (7210)	< 0.1	100 DNR
ZINC (7950)	13	500 DNR

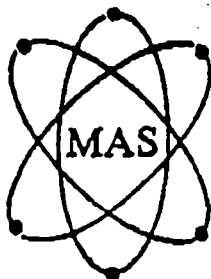
ANALYSES PERFORMED BY: KEVIN J. O'MARA and RICHARD A. KERN

*Kevin J. O'Mara*

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Phone: (313) 964-36  
FAX No.: (313) 964-23

DATE: 6/26/90

ATTENTION: MRS. SUE O'MARA  
GREAT LAKES ENVIRONMENTAL SERVICES INC.  
22077 MOUND RD. P.O. BOX 1208, WARREN MI. 48901-1208

SAMPLE IDENTIFICATION: EPOXY WASTE WG 10215 EAGLE PITCHER/SILAS TANK  
ALBION SHERIDAN TWP

MAS PROJECT NUMBER (S): 9040

PHYSICAL DESCRIPTION: BIPHASIC LIQUID

STARTED: 6/18/90 COMPLETED: 6/25/90

SAMPLE PREP: THE SAMPLE WAS ANALYZED " TCLP "

DATA: ALL METHODS ARE FOUND IN EPA SWS 846 A-C

	SAMPLE RESULT	EPA LIMIT
IGNITIBILITY (1010)	80 F	< 140 F
pH VALUE (9040)	8.85	< 2.0 or > 12.5
REACTIVITY:		
REACTIVE CYANIDE	< 1 ppm	250 ppm
REACTIVE SULFIDE	< 10 ppm	500 ppm
TCLP METALS: (ppm)		
ARSENIC (7060)	< 0.05	5.0
BARIUM (7080)	< 0.5	100
CADMIUM (7130)	< 0.1	1.0
CHROMIUM TOTAL (7190)	< 0.1	5.0
LEAD (7420)	0.2	5.0
MERCURY (7470)	< 0.05	0.2
NICKEL (7520)	< 0.1	---
SELENIUM (7740)	< 0.05	1.0
SILVER (7760)	< 0.1	5.0
THALLIUM (7840)	< 0.5	---
COPPER (7210)	< 0.1	100 DNR
ZINC (7950)	0.77	500 DNR

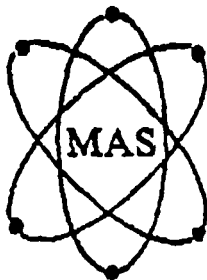
ANALYSES PERFORMED BY: KEVIN J. O'MARA and RICHARD A. KERN

*Kevin O'Mara*

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FAX No.: (313) 964-2

DATE: 6/26/90

ATTENTION: MRS. SUE O'MARA  
GREAT LAKES ENVIRONMENTAL SERVICES INC.  
22077 MOUND RD, P.O. BOX 1208, WARREN MI. 48901-1208

SAMPLE IDENTIFICATION: DEBRIS WG10216 EAGLE PITCHER/SILAS TANK  
ALBION SHERIDAN TWP

MAS PROJECT NUMBER (S): 9041

PHYSICAL DESCRIPTION: WHITE SOLID RAG

STARTED: 6/18/90 COMPLETED: 6/25/90

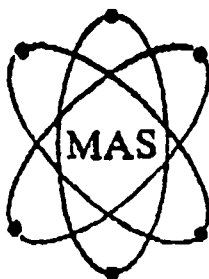
SAMPLE PREP: THE SAMPLE WAS ANALYZED " TCLP "

DATA: ALL METHODS ARE FOUND IN EPA SWS 846 A-C

	SAMPLE RESULT	EPA LIMIT
IGNITIBILITY (1010)	> 200 F	< 140 F
pH VALUE (9040)	6.60	< 2.0 or > 12.5
REACTIVITY:		
REACTIVE CYANIDE	< 1 ppm	250 ppm
REACTIVE SULFIDE	< 10 ppm	500 ppm
TCLP METALS: (ppm)		
ARSENIC (7060)	< 0.05	5.0
BARIUM (7080)	< 0.5	100
CADMIUM (7130)	< 0.1	1.0
CHROMIUM TOTAL (7190)	< 0.1	5.0
LEAD (7420)	< 0.1	5.0
MERCURY (7470)	< 0.05	0.2
SELENIUM (7740)	< 0.05	1.0
SILVER (7760)	< 0.1	5.0
COPPER (7210)	< 0.1	100 DNR
ZINC (7950)	0.45	500 DNR

ANALYSES PERFORMED BY: KEVIN J. O'MARA and RICHARD A. KERN

*Kevin O'Mara*



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2727 Second Avenue  
Detroit, Michigan 48201

Phone: (313) 964-3655  
FAX No.: (313) 964-2333

DATE: 6/26/90

ATTENTION: MRS. SUE O'MARA  
GREAT LAKES ENVIRONMENTAL SERVICES INC.  
22077 MOUND RD, P.O. BOX 1208, WARREN MI. 48901-1208

SAMPLE IDENTIFICATION: SOLIDS WG 10217 EAGLE PITCHER/SILAS TANK

MAS PROJECT NUMBER (S): 9042

PHYSICAL DESCRIPTION: BROWN AND BLACK SOLID

STARTED: 6/18/90 COMPLETED: 6/25/90

SAMPLE PREP: THE SAMPLE WAS ANALYZED " TCLP "

DATA: ALL METHODS ARE FOUND IN EPA SWS 846 A-C

	SAMPLE RESULT	EPA LIMIT
IGNITIBILITY (1010)	> 200 F	< 140 F
pH VALUE (9040)	6.20	< 2.0 or >12.5
REACTIVITY:		
REACTIVE CYANIDE	< 1 ppm	250 ppm
REACTIVE SULFIDE	< 10 ppm	500 ppm
TCLP METALS: (ppm)		
ARSENIC (7060)	< 0.05	5.0
BARIUM (7080)	< 0.5	100
CADMIUM (7130)	< 0.1	1.0
CHROMIUM TOTAL (7190)	< 0.1	5.0
LEAD (7420)	< 0.1	5.0
MERCURY (7470)	< 0.05	0.2
SELENIUM (7740)	< 0.05	1.0
SILVER (7760)	< 0.1	5.0
COPPER (7210)	< 0.1	100 DNR
ZINC (7950)	0.28	500 DNR

ANALYSES PERFORMED BY: KEVIN J. O'MARA and RICHARD A. KERN

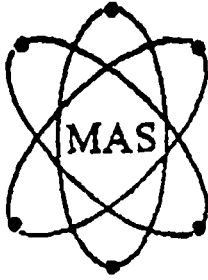
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Phone: (313) 964-3680  
FAX No.: (313) 964-2339

DATE: 6/26/90

ATTENTION: MRS. SUE O'MARA  
GREAT LAKES ENVIRONMENTAL SERVICES INC.  
22077 MOUND RD, P.O. BOX 1208, WARREN MI. 48901-1208

SAMPLE IDENTIFICATION: TANK CLEAN OUT WG 10218  
EAGLE PITCHER/SILAS TANK

MAS PROJECT NUMBER (S): 9043

PHYSICAL DESCRIPTION: BIPHASIC LIQUID

STARTED: 6/18/90 COMPLETED: 6/25/90

SAMPLE PREP: THE SAMPLE WAS ANALYZED " TCLP "

DATA: ALL METHODS ARE FOUND IN EPA SW8 846 A-C

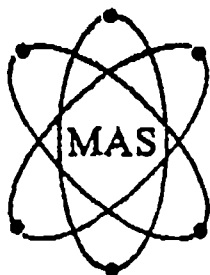
	SAMPLE RESULT	EPA LIMIT
IGNITIBILITY (1010)	146 F	< 140 F
PH VALUE (9040)	8.95	< 2.0 or > 12.5
REACTIVITY:		
REACTIVE CYANIDE	< 1 ppm	250 ppm
REACTIVE SULFIDE	< 10 ppm	500 ppm
TCLP METALS: (ppm)		
ARSENIC (7060)	< 0.05	5.0
BARIUM (7080)	< 0.5	100
CADMIUM (7130)	< 0.1	1.0
CHROMIUM TOTAL (7190)	< 0.1	5.0
LEAD (7420)	< 0.1	5.0
MERCURY (7470)	< 0.05	0.2
NICKEL (7520)	< 0.1	---
SELENIUM (7740)	< 0.05	1.0
SILVER (7760)	< 0.1	5.0
THALLIUM (7840)	< 0.5	---
COPPER (7210)	0.4	100 DNR
ZINC (7950)	1.5	500 DNR

ANALYSES PERFORMED BY: KEVIN J. O'MARA and RICHARD A. KERN

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2727 Second Avenue  
Detroit, Michigan 48201

Phone: (313) 964-3680  
FAX No.: (313) 964-2339

DATE: 6/26/90

ATTENTION: MRS. SUE O'MARA  
GREAT LAKES ENVIRONMENTAL SERVICES INC.  
22077 MOUND RD, P.O. BOX 1208, WARREN MI. 48901-1208

SAMPLE IDENTIFICATION: RAIN WATER WG 10219  
EAGLE PITCHER/SILAS TANK

MAS PROJECT NUMBER (S): 9044

PHYSICAL DESCRIPTION: BEIGE LIQUID WITH SOLIDS

STARTED: 6/18/90 COMPLETED: 6/25/90

SAMPLE PREP: THE SAMPLE WAS ANALYZED " TCLP "

DATA: ALL METHODS ARE FOUND IN EPA SWS 846 A-C

	SAMPLE RESULT	EPA LIMIT
IGNITIBILITY (1010)	> 200 F	< 140 F
pH VALUE (9040)	10.45	< 2.0 or > 12.5
REACTIVITY:		
REACTIVE CYANIDE	< 1 ppm	250 ppm
REACTIVE SULFIDE	< 10 ppm	500 ppm
TCLP METALS: (ppm)		
ARSENIC (7060)	0.23	5.0
BARIUM (7080)	< 0.5	100
CADMIUM (7130)	< 0.1	1.0
CHROMIUM TOTAL (7190)	0.48	5.0
LEAD (7420)	< 0.1	5.0
MERCURY (7470)	< 0.05	0.2
NICKEL (7520)	< 0.1	---
SELENIUM (7740)	< 0.05	1.0
SILVER (7760)	0.3	5.0
THALLIUM (7840)	< 0.5	---
COPPER (7210)	< 0.1	100 DNR
ZINC (7950)	3.3	500 DNR

ANALYSES PERFORMED BY: KEVIN J. O'MARA and RICHARD A. KERN

*Kevin J. O'Mara*

**ENVIRONMENTAL ENGINEER**

22077 MOUND ROAD  
WARREN, MI 48091-1208  
(313) 758-0400  
TELECOPIER (313) 758-1129

## SUMMARY SHEET

DATE \_\_\_\_\_

6-14-90

COMPOSITE

DRUM # 3

11.

SAMPLE 1

LAB REQUEST, POSSIBLE DISPAL P/N

Paint Waste - (B9) B10, B13, B14, B16, B17, B18, B8	1	WG-10212	RCRA, N, TL	N
* Grease - B1, B11, B12, B15, A4	2	WG-10213	RCRA, N, TL, PCB	N
Rain Water - B2, B3, A4 (B7)	3	WG-10219	RCRA, N, TL	P
Epoxy Waste - A1, (A2), (A3) A10	4	WG-10215	RCRA, N, TL	N
Debris - B22	5	WG-10216	RCRA	N
Solids - B24, B26	6	WG-10217	RCRA	N
Tank Clean Out - <del>B</del> Tank (B22)	7	WG-10218	RCRA, N, TL	P

Ann,

Let me know if you'll need anything else regarding the sample analysis information.

Cathy

**GREAT LAKES  
ENVIRONMENTAL SERVICE**

P/N=NON PUMPABLE

Eagle Pitches  
GENERATOR Albion-Sheridan Twp

LAB WORK-UP

DATE 6/14/90

JOB# 20-6206

PAGE 1 OF 2

DRUM #	MATERIAL DESCRIPTION	ANALYTICAL COMPOSITE		ADDITIONAL NOTES
		PH, FLASH OTHER	#	
B1	Grease	no flash	2	
B2	clear liquid with debris	no flash	3	strong gas smell
B3	clear liquid with debris	no flash	3	
B4	clear liquid with tan skin	no flash	3	
B7	clear liquid with debris	no flash, pH=7	3	probably rain water
B8	Green paint	flash	1	
B10	green paint	flash	1	
B11	Grease	no flash	2	
B12	Grease	no flash	2	
B13	viscous orange liquid	flash pH=6	1	
B14	Orange paint	flash	1	
B15	Grease	no flash	2	
B16	Blue paint	flash	1	
B17	Yellow paint	flash	1	2 phase
B18	brown viscous liquid		1	
B22	water & Plastic Bags/debris		5	
B24	Flakes of brown solids & water	pH=6	6	
B26	Flakes of brown solids		6	
A1	tan viscous substance	pH=7	4	2 phase, thin liquid (solvent?), red flame
A2	thin dark liquid	pH=9 no flash	4	solvent odor

GREAT LAKES  
ENVIRONMENTAL SERVICE

LAB WORK-UP

Eagle - Pitcher  
GENERATOR Albion - Sheridan Twp  
JOB # 20-6206

DATE 6/14/90

PAGE 2 OF 2

[illegible]

**GREAT LAKES  
ENVIRONMENTAL SERVICE**

Eagle Pitcher

## DRUM SAMPLING

GENERATOR

Albion-Sheridan Twp

DATE

6/11/90

JOB #

20-6206

PAGE

1 OF 2

DRUM#	DESCRIPTION	OVER					QUANTITY	P/N
		L/S	PAK	TOP	RING	BUNG		
B1	Black sludge		X	X			55gal	N
B2	Hole in vent		X				55gal	P
B3	Missing vent		X				55gal	P
B4	dented, missing vent		X				55gal	P
B5	Empty, laying sideways, <sup>rusty</sup> bullet holes					X	55gal	N
B6	dented, upside down, empty						30gal	-
B7	cut in half, oil residue		X	X	X		55gal	-
B8	pressurized, sideways empty						30gal	N
B9	sideways, <sup>solidified material</sup> seeping through bung hole		X				55gal	N
B10	<sup>rusty top</sup> solidified material seeping through		X				55gal	N
B11	<sup>partially buried</sup> oily material seeped through top		X				55gal	N
B12	seeping material, partially buried		X				55gal	N
B13	sideways (semi-buried)		X				55gal	N
B14	sideways		X				55gal	N
B15	sideways		X				55gal	N
B16	sideways, leaking blue paint <sup>bung hole</sup> through		X				55gal	N
B17	leaking yellow paint through bullet hole		X				55gal	N
B18	rusty, solidified material leaking out		X				55gal	N
B19	empty							-
B20	empty, crushed							-
B21	bottom rusty, empty							-
B22	open top, filled with trash		X					N
B23	missing							-
B24	open top, resting off		X	X				N

GREAT LAKES  
ENVIRONMENTAL SERVICE

## DRUM SAMPLING

## GENERATOR

Albion-Sheridan Twp

DATE \_\_\_\_\_

6/11/90

**JOB** 22

20-6206

PAGE

2 OF 2

[illegible]

6-19-90

Ann,

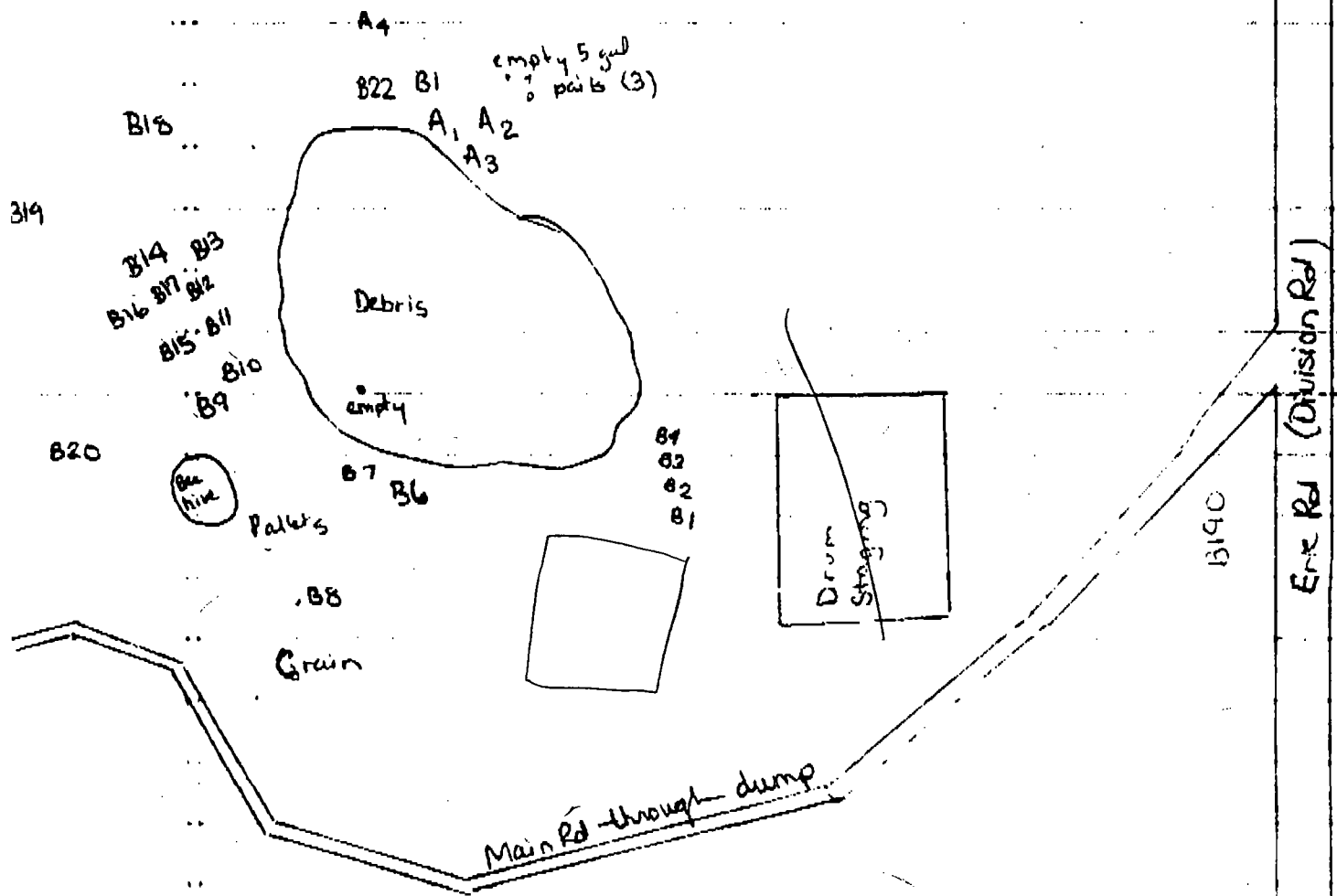
Attached is the map of the area with the drums. This is a rough ~~copy~~ draft, I will get a CAD copy done probably latter this week. Also this week I will send you the results of the screening of the samples and a summary of the sampling job. If you have any other questions, please call me at (313) 758-0400.

Cathy Gibbons

## Albion Sheridan Township Landfill

B24 B26

*Handwritten notes:*  
 some were  
 samples  
 obtained  
 from  
 drums  
 + hand  
 waste



Sampled drums

6-11-90 &amp; 6-13-90

Catherine Gibbons

Great Lakes Env Svs

From: FREEMAN, BRIAN P (BFREEMAN)  
To: R5WASTE:MNOVY  
Date: Thursday, May 27, 1993 8:51 am  
Subject: Albion Sheridan Township Landfill

Yesterday, I received a fax from Elizabeth Uhl (of WW Engineering) stating that they had not received a data review package from the CRL, that had been sent here in February, 1993. (I must first state that I came on board with EPA on 4/5/93).

Upon my inspection, I found that they data package was still within CRL, and review had not been completed as yet. I pressed the situation with our data review contractors, and they promise that the package will be reviewed and returned to Elizabeth Uhl at WW Engineering early next week.

This hold up was primarily due to three (3) moves of critical CRL/LSSS staff during the Feb-Apr 93 period. I've called Elizabeth and apologized for this data bottleneck. They're happy.

CC: R5WASTE:MTYSON, DEWESOLO

  
**WW Engineering & Science**  
A Summit Company

5555 Glenwood Hills Parkway SE

PO Box 074

Grand Rapids, MI 49588-0874

616/942-9600 Fax 616/942-6499

**FAX**(616)  
942-9600Date: 5-25-93Leadsheet + 1 Page(s)Name of Recipient(s): Brian FreemanCompany: USEPA Division: CRLFAX Number: 312-886-2571 Phone Number: \_\_\_\_\_Name of Sender: Liz WLPDivision: WWES - ESDProject No.: 04000.30

FAX Number 616/942-6499

Subject: ALBION-SHERIDAN TOWNSHIP LANDFILL

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Initials of FAX Operator: \_\_\_\_\_

Date: \_\_\_\_\_ Time: \_\_\_\_\_



May 25, 1993

Mr. Brian Freeman, RSCC  
U.S. Environmental Protection Agency  
Central Regional Laboratory  
536 South Clark Street  
Chicago, IL 60605

RE: Albion-Sheridan Township Landfill, Case 19427, TCL Organics Data Package

Dear Brian:

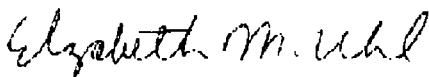
We have not received the organics data package for Case 19427. This case consisted of 6 low concentration water samples for analysis of full TCL organics and 2 low concentration water samples for analysis of VOA only. The samples were sent from the Albion-Sheridan Township Landfill to Pace, Inc. in Minneapolis during the week of February 1, 1993.

The organic traffic report numbers include; EFR42, EFR43, EFR44, EFR45, EFR46, EFR47, EFR48 AND EFR49.

Please have this data package sent to me as soon as possible. We are currently in the report preparation stage and this data is particularly critical to our investigation. Thank you for your cooperation.

Sincerely yours,

WW ENGINEERING & SCIENCE, INC.  
Environmental Services Division



Elizabeth M. Uhl  
Site Project Manager

cc: Mary Beth Novy, U.S. EPA RPM RSWASTE  
Jeff Clark, Lockheed ESAT  
04011, 32

MARY PAT  
MS Tyson  
63006  
RS  
WASTE

ekr: & AARCS0401 FreemanJ

5555 Greenwood Hills Parkway SE, PO Box 871, Grand Rapids, MI 49506-0074, 616/942-9000, Fax 616/942-6499  
Bloomington, IN, Cincinnati, OH, Detroit, MI, Indianapolis, IN, Milwaukee, WI, Minneapolis, MN

14852

**EPA REGION V  
FOURTH QUARTER FY93 ORGANIC, INORGANIC AND DIOXIN PROJECTIONS**

SITE NAME REGION IV - ALL QAPP STATUS \_\_\_\_\_

CONTRACTOR COMPANY \_\_\_\_\_

DATE: \_\_\_\_\_

	JULY		AUGUST		SEPTEMBER	
	SOIL & WATER	RES WELLS	SOIL & WATER	RES WELLS	SOIL & WATER	RES WELL
FULL TCL ORGANIC	640	<del>100</del>	550	<del>100</del>	475	<del>100</del>
VOA ONLY	70		60		50	
BNA ONLY	25		20		20	
PEST/PCB ONLY	5		5		5	
FULL METALS AND CYANIDE	645		555		475	
METALS ONLY	50		40		30	
CYANIDE ONLY						
HI-CONC. ORGANIC (SAS)	60		20		20	
HI-CONC METALS ONLY						
HI-CONC METALS & CYANIDE						
HI-CONC CYANIDE ONLY						
HI-CONC PH & CONDUCT. ONLY						
PCDD/PCDF	50		50		50	
14 DAY T/A ORGANIC						
14 DAY T/A INORGANIC						
FULL TCL HI-CONC ORGANIC						
FAST TA 2,3,7,8 TCDD						
LOW CONC WATER-INORGANIC						
LOW CONC WATER-ORGANIC		100		100		100

**Please remember that this form does not replace WRITTEN FAXED SAMPLING CONFIRMS by TUESDAY of the PRECEEDING WEEK BY 12 NOON!**

PLEASE FILL ONE OF THESE OUT FOR EACH REMEDIAL SITE YOU HAVE PLANNED DURING THIS QUARTER. SI SITES CAN BE COLLECTIVELY TOTALED (STATES, FIT, ETC.).

Sampling Coordinator RSEC - Brian P. Fullen  
DATE: 5/26/93 (Signature)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION V

DATE: 18 NOVEMBER 1992

SUBJECT: SAS SOLICITATION FOR ALBION SHERIDAN TOWNSHIP LANDFILL  
ALBION, MI RI/FS-AN  
CERCLIS # MID 980 504 450  
SAMPLER: WWES

FROM: JAN PELS, RSCC *J. Pels*

TO: JULIE FRANKEL, SMO

Please solicit for the samples listed on the attached page using the Region V Standardized SASS noted at the top of each column. Sampling will begin the week of 12/7/92 and will continue through the week of 12/21/92. Please solicit labs which have demonstrated their capability to perform these analyses.

A 21 day turnaround is requested.

Please call if you have any questions.

Contractor Name:

WW ENGINEERING &amp; SCIENCE, INC.

Check Here  
if Revised

Schedule For:

ALBION-SHERIDAN TWP LANDFILL

(site name)

ALBION, MI

SPILL CODE - AN

City, State, Site/Spill ID:

MID980504450

Cercis Number:

Signature/Date:

ELIZABETH M. UHL

11/16/92

*Elizabeth Uhl*

## ANALYTES

Week of Sampling/ Sample Matrix	TOC SAS 5/020	COD SAS 5/018	BOD SAS 5/017	TSS SAS 5/025	TDS SAS 5/024
GROUNDW LOW 12-7-92	12	12	12	12	12
GROUNDW LOW 12-14-92	19	19	19	19	19
GROUNDW LOW 12-21-92	8	8	8	8	8
LEACHATE MED 12-14-92	5	5	5	5	5
<b>Totals:</b>					
Water	44	44	44	44	44
Soil					

- \* TOTALS LISTED HERE SHOULD MATCH THE TOTALS WRITTEN ON THE SAS REQUEST FORMS.
- \* THIS FORM SHOULD ACCOMPANY ALL SAS REQUEST FORMS.

Anytime there are revisions for a SAS request, either in total number of samples or in the scheduled dates, a revised copy of this form must be submitted after verbal communication.

Description of Activity:

GROUNDWATER SAMPLING OF MONITORING WELLS AND SAMPLING OF LEACHATE FROM MONITORING WELLS INSTALLED ON THE LANDFILL

Sampling Equipment:

BAILERS, PUMPS

Types of Problems Anticipated:

WEATHER RELATED PROBLEMS, ALL OF THE WELLS ARE NOT YET INSTALLED.

Contractor Name:

WW ENGINEERING &amp; SCIENCE, INC.

Check Here  
If Revised

Schedule For:

ALBION-SHERIDAN TWP LANDFILL

(site name)

ALBION, MI

SPILL CODE - AN

City, State, Site/Spill ID:

MID980504450

Cerculis Number:

Signature/Date:

ELIZABETH M. UHL 11-16-92

*Elizabeth Uhl*

## ANALYTES

Week of Sampling/ Sample Matrix	OIL & GREASE 5/021 SAS	CHLORIDE 5/005 SAS	SULFATE 5/011 SAS	NITRATE/ Nitrate 5/014 SAS	AMMONIA 5/013 SAS	TKN NITROGEN 5/015 SAS		
GROUNDW LOW 12-7-92	12	12	12	12	12	12		
GROUNDW LOW 12-14-92	19	19	19	19	19	19		
GROUNDW LOW 12-21-92	8	8	8	8	8	8		
LEACHATE MED 12-14-92	5	5	5	5	5	5		
<b>Totals:</b>								
Water	44	44	44	44	44	44		
Soil								

\* TOTALS LISTED HERE SHOULD MATCH THE TOTALS WRITTEN ON THE SAS REQUEST FORMS.

\* THIS FORM SHOULD ACCOMPANY ALL SAS REQUEST FORMS.

Anytime there are revisions for a SAS request, either in total number of samples or in the scheduled dates, a revised copy of this form must be submitted after verbal communication.

Description of Activity: GROUNDWATER SAMPLING (LOW CONCENTRATION) OF MONITORING WELLS AND SAMPLING OF LEACHATE (MEDIUM CONCENTRATION) FROM MONITORING WELLS INSTALLED ON THE LAND

Sampling Equipment:

BAILERS, PUMPS

Types of Problems Anticipated: WEATHER RELATED PROBLEMS, ALL OF THE WELLS ARE NOT YET INST

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION V

DATE: 10/28/92  
SUBJECT: SAS Solicitation for WWES: Albion Sheridan Township Landfill  
FROM: Jan Pels, RSCC Albion, MI RI/FS-AN  
Cerclis # MID 980 504 450  
TO: Julie Frankel, SMO

Please solicit for a total of 7 soils to be collected during the weeks of 11/9/92 and 11/16/92 for the analysis of Cation Exchange Capacity (CEC) and TCLP Metals using the attached SASs. Please solicit labs which have demonstrated their ability to perform these analyses. (Samples will be collected in separate jars and will not need to be shipped to the same lab.)  
a turnaround time of 35 days is requested.  
Please call if you have any questions.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION V

DATE: 9/14/92  
SUBJECT: SAS Solicitation for Albion Sheridan Township Landfill  
Albion, MI RI/FS-AN  
FROM: Jan Pels, RSCC  
Cerlis # MID980504450  
TO: Julie Frankel, SMO  
Eleanor MacLean, SMO

Please solicit for the samples listed on the following page using the Standardized SASs noted at the top of each column. Sampling will begin the wk of Oct. 5, 1992. Please solicit labs which have demonstrated their capability to perform these analyses.

A 21 day turnaround is required.

Please call if you have any questions.

CI- Method 325.2 OK

Contractor Name:

WW ENGINEERING &amp; SCIENCE, INC

(WWS)

Schedule For:

ALBION-SHERIDAN TWP LANDFILL

(site name)

City, State, Site/Spill ID:

ALBION, MICHIGAN

Spill Code AN

Cercis Number:

MID980504450

Signature/Date:

ELIZABETH UHL 9/14/92

Elizabeth M. Uhl

PAGE 1 OF 2

## ANALYTES

Week of Sampling/ Sample Matrix	Soil SAS TOC, % solids Rev. 2.0, 2/15/91	SAS AMMONIA	SAS TDS	SAS TSS	SAS CHLORIDE	SAS SULFATE	SAS NITRATE/ Nitrite 5/014
Oct. 5/92			27	27	27	27	
Oct. 12/92	27						
Oct. 19/92	18						
Oct. 26/92		22			22	22	22
<b>Totals:</b>							
<b>Water</b>		22	27	27	49	49	22
<b>Soil</b>	45						

ALBION-SHERIDAN TWP LANDFILL SITE QAPP NOT YET APPROVED, HOWEVER, I FELT IT IMPORTANT TO SEND THE MONTHLY PROJECTIONS FOR Oct. ., 1992 ANYWAY.

Description of Activity:

WEEK OF 10/5 - SURFACE WATER SAMPLING

WEEK OF 10/12 - SEDIMENT SAMPLING

WEEK OF 10/19 - SURFACE SOIL SAMPLING

Sampling Equipment:

WEEK OF 10/26 - RESIDENTIAL WELL SAMPLING

PONAR DREDGES, STAINLESS STEEL TROWELS, BOAT

U.S. ENVIRONMENTAL PROTECTION AGENCY  
CLP Sample Management Office  
P.O. Box 818 - Alexandria, VA 22313  
Phone: 703-557-2490 - FTS 557-2490

SAS Number

**SPECIAL ANALYTICAL SERVICES**  
**Client Request**

Regional Transmittal

Telephone Request

- A. EPA Region and Client: Region V/WWES  
B. Regional Representative: Jan Pels, RSCC  
C. Telephone Number: 312-353-2720  
D. Date of Request:  
E. Site Name: Albion-Sheridan Township Landfill, Albion, MI

Please provide below description of your request for Special Analytical Service under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in a delay in the processing of your request. Please continue response on additional sheet or attach supplementary information as needed.

1. General description of analytical service requested:

Analysis of soils/sediments/solids by Toxicity Characteristic Leaching Procedure (TCLP) -- Method 1311 of Federal Register June 29, 1990 for the eight regulated metals. TCLP sample extracts must be prepared within 28 days of the date of sample collection for Hg and 180 days for all other metals. Use a minimum sample aliquot of TCLP extract to determine compliance with TCLP regulatory levels.

2. Definition and number of work units involved (specify whether whole samples or fractions; whether organics or inorganics; whether aqueous or soil and sediments; and whether low, medium or high concentration):

7 landfill waste soil/sediment/solid samples (includes field duplicates) for analysis by TCLP -- Method 1311 of Federal register June 29, 1990 for the eight regulated metals, and for the 8 regulated metals corrected for average MS/MSD recovery. \*

3. Purpose of analysis (specify whether Superfund (enforcement or remedial action), RCRA, NPDES, etc.): RI/FS

\* The samples will have low to medium concentrations of Cr, <sup>CN</sup>~~Cd~~, Pb, <sup>AS</sup>~~Cd~~, Cd, Cu, and Zinc. The samples may have high concentrations of chromium.

4. Estimated date(s) of collection:
5. Estimated date(s) and method of shipment daily overnight carrier
6. Number of days analysis and data required after laboratory receipt of samples:  
Samples must be extracted within 28 days of collection for Hg and within 180 days for all other metals; TCLP extracts must be analyzed within 28 days of extraction for Hg. Data package due - 35 days from receipt of last sample.
7. Analytical protocol required: Method 1311 of Federal Register - June 29, 1990 for extraction. CLP SOW 7/88 or ILM01 for analysis of extracts with modifications of Attachment I and Table 1.
8. Special technical instruction (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.):

See Attachment I and Table 1. Soils will be collected in 1-liter wide-mouth glass jars for metals. Samplers are instructed to add only soil. If interstitial water is present on arrival the laboratory, please remix water with soil prior to initiation of Method 1311. Standardize the acetic acid solutions (Section 5.7.2), and the 1N HCl (Section 5.3) by titrating with standard 0.1N NaOH before use. Must be within +/-5% of required value.

Analysis of diluted TCLP extract will be done using SOW 7/88 or ILM01 and QC requirements of Attachment II.  
CASE NARRATIVE MUST DISCUSS ANY SAMPLE PROBLEMS.

9. Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain-of-Custody documentation, etc.). If not completed, format of results will be left to program discretion.

Attachment I and Method 1311 provide information required for extraction. Use SOW 7/88 or ILM01 for providing Table 1 constituents. Separate Form I's are to be provided for Table 1 constituents and for Table 1 constituents corrected for average MS/MSD recoveries from TCLP extracts. Form I's will also include extraction information of Items "a" through "e" and Item "g" of Attachment I.

10. Other (use additional sheets or attach supplementary information, as needed):  
Data rejection and non payment will be recommended if the laboratory does not follow the methods referenced in this SAS. Lab must submit all original field documentation (COCs, tags, SAS PLs, etc.) and originals of data to the Region in the time frame referenced in Section 6 of this SAS (analogues to a RAS-CSF).
11. Name of sampling/shipping contact Liz Uhl (616) 942-9600 ext. 404

**I. DATA REQUIREMENTS**

<u>Parameter</u>	<u>Detection Limit</u>	<u>Duplicate Precision Desired</u> ( $\pm$ % or Conc.)
See Table 1 All ICP measurements of SOW 7/88 or ILM01 are to be included but remaining TALs need not be reported.	See Table 1	Use $\pm$ 25% difference (advisory for TALs).

**II. QC REQUIREMENTS**

<u>Audits</u>	<u>Frequency</u>	<u>Limits*</u>
<u>TCLP Extraction</u>		
Prep. Blank for Extract Fluid #1 (see 7.1.4.4 of Method 1311)	Each set of solid samples prepared	<5% of Regulatory levels of Table 1. Discuss in case narrative if larger than CRLDs of SOW.
Prep. Blank for Extract Fluid #2, if necessary	Same	Same

Analysis of TCLP Extracts

Preparation blank for TCLP Extract Determinations.	Per appropriate SOW and set-up with each TCLP extract batch	CRLD of appropriate SOW for Table 1 constituents.
MS/MSD (see Table 1)	See Table 1 (required for inorganics) 1 for each set of 8 sample extracts.	Advisory - used to correct TCLP values recovery. See Note 1 of Table 1. $RPD \leq 20\%$ (MS/MSD)
All other QC audits per SOW 7/88 or ILM01	per SOW 7/88 or ILM01	per SOW 7/88 or per ILM01

**III. ACTION REQUIRED IF LIMITS ARE EXCEEDED:**

Call SMO for corrective action and reanalysis. Reanalysis of TCLP extracts may be necessary per requirements of Note 1 to Table 1.

TCLP Extraction will be done by Federal Register of June 29, 1990 (attached) including bottle extraction for metals. Samples will be wet soils or sediments; therefore, the filtration procedure (Section 7.1.1.7 of attached procedure) may produce interstitial water. Also any water collecting on top of sediment or soil is not to be discarded, but mixed with sample prior to filtration or % solid determination (Section 7.1.1). TCLP Extracts may be a combination of liquid filtrate and solid TCLP extracts (see Sections 7.2.13.2 and 7.3.14) but will depend on the physical nature of the soils collected. Particle size reduction is not expected to be necessary for these soils. Sample preparation logs will be needed to record all required information of Method 1311 including (but not limited to):

- a. Weight(s) of extracted samples (100g minimum aliquot size is required for 100% solids content) and volume of any filtrate (Sections 7.2.2 and 7.2.5).
- b. Preliminary evaluations of percent (%) solids.
- c. pH data for selection of Extraction Fluid #1 or #2 (Section 7.1.4.2)
- d. Dates of each preparation step, with associated weights and measured volumes.
- e. pH value of final TCLP extract (Section 7.2.14)
- f. Holding times (Section 7.4) are to be met and are to be counted from the date of collection.
- g. Record HCl normality (Section 5.3) and acetic acid normality (Section 5.7.2) (SAS par. 8) and measured pH of Extraction fluids (Section 5.7.1 and 5.7.2). Record dates of each of required measurements.
- h. Standardization of Hydrochloric acid and acetic acid for Extraction Fluid #1 and Extraction Fluid #2.
  1. The 1 N HCl can be and will be standardized to  $1.0 \text{ N HCl} \pm 5\%$ .
  2. The pH of Extraction Fluid #1 will be  $4.93 \pm 0.05$ . No standardization of acetic acid can be done - See Section 5.7.1 of Method in Federal Register 6-29-90.
  3. The pH of Extraction Fluid #2 will be  $2.88 \pm 0.05$ . Standardization of acetic acid is not mandatory but will be done for informational purposes (Optional) and will be compared to theoretical value of 5.7 mL glacial acetic acid diluted to 1 liter. Titration of acetic acid normality can not be used for contract compliance purposes if correct pH value is obtained (2.88).
- i. TCLP combined extract aliquots will be acidified for subsequent metals analysis (Section 7.2.14).

ITEMS "a" THROUGH "e" AND ITEM "g" MUST BE A PART OF FORM I REPORT.

Analysis of TCLP extracts will be done to determine compliance with Regulatory Levels using minimum sample aliquot volumes necessary for this purpose.

<u>Determination</u> <u>(ml)</u>	<u>Sample Aliquot</u> <u>(mls)</u>	<u>Final Volume Taken</u> <u>for SOW Analysis</u> <u>After Dilution of</u> <u>Sample Aliquot</u>
Metals (ICP)	10	100
Metals (GFAA)	10	100
Hg (CVAA)	5	100

Sample aliquot sizes are to be minimized, as above, to alleviate interferences from acetic acid/acetate buffer, to provide CRQLs that are 10 - 20% of Regulatory Levels, and to expand the working concentration range of the test procedures.

All constituents of Table 1 are required to be determined and reported for TCLP extracts. Remaining TALs of 7/88 or ILM01 are not required, except that all ICP emission spectroscopy measurements required by SOW 7/88 or ILM01 are to be made and included in raw data. A matrix spike (MS)/matrix spike duplicate (MSD) for all constituents in Table 1 will be prepared and determined using one of the TCLP soil extracts. The same extract need not be used for all analyses (ICP, GFAA, or CVA).

MS/MSD results are advisory and used for calculation purposes.

TCLP CONSTITUENTS TO BE DETERMINED BY METHOD 1311,  
TCLP REGULATORY LEVELS, SAMPLE ALIQUOT VOLUMES TO BE USED,  
AND MS/MSD LEVELS AND CRQLS TO BE USED  
FINAL DILUTED SAMPLE ALIQUOTS (100 ml)<sup>1</sup>

<u>Contaminant</u>	<u>Regulatory Level</u> <u>(ug/L)</u>	<u>Sample Aliquot Volume</u> <u>ml</u>	<u>MS/MSD Level</u> <u>in Final Aliquot Dilution</u> <u>(ug/L)</u>	<u>CRQL</u> <u>in Final Aliquot Dilution</u> <u>(ug/L)</u>
<b>METALS</b> (SOW 7/88 or ILM01)				
As (GFAA)	5,000	10	500	50
Ba (ICP)	100,000	10	10,000	1,000
Cd (ICP)	1,000	10	100	10
Cr (ICP)	5,000	10	500	50
Pb (ICP or GFAA)	5,000	10	500	50
Hg (CVAA)	200	5	10	0.5
Se (GFAA)	1,000	10	100	10
Ag (ICP)	5,000	10	500	50

Note 1: TCLP Extraction of June 29, 1990 requires correction of constituent values for matrix spike recoveries. See Section 8.2 of Method 1311 of Federal Register June 29, 1990.

The average MS/MSD recovery developed for 1 of the soil extracts will be applied to all of the soil extracts. It is not expected that the samples will provide TCLP values that will exceed Regulatory Levels; however, there is a finite chance that this will occur.

If any one TCLP analyte in an extract exceeds Regulatory Levels, the extracts reanalysis is unnecessary using a Regulatory Matrix Spike concentration (see Section 8.2 of Method 1311).

If the concentration of the analyte after correction for the matrix spike recovery is > 10% of but less than the regulatory level, the TCLP extract must be reextracted using a smaller aliquot and spiked at the regulatory level such that the native analyte is at approximately the regulatory level.

If sample concentrations exceed the calibration range, sample must be diluted to fall within the calibration range.

U.S. ENVIRONMENTAL PROTECTION AGENCY  
CLP Sample Management Office  
P.O. Box 818 - Alexandria, Virginia 22313  
Phone: 703/557-2490 - FTS/557-2490

SAS Number

### SPECIAL ANALYTICAL SERVICES

#### Client Request

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Regional Transmittal

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Telephone Request

- A. EPA Region/Client Region V / WWES
- B. RSCC Representative: Jan Pels
- C. Telephone Number: (312) 353-2720
- D. Date of Request
- E. Site Name: Albion-Sheridan Township Landfill Site

Please provide below a description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in delay in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. General description of analytical service requested: Analysis of soils for cation exchange capacity.
2. Definition and number of work units involved (specify whether whole samples or fractions; whether organics or inorganics; whether aqueous or soil and sediments; and whether low, medium, or high concentration):
- 7 soil samples (including duplicates). The samples will have
- low to medium concentrations of Cr, ~~Co~~, Pb, ~~As~~, Cd, Cu, and Zinc
- and may have high concentrations of chromium.
3. Purpose of analysis (specify whether Superfund (enforcement or remedial action), RCRA, NPDES, etc.): Superfund - RI/ES

4. Estimated date(s) of collection: \_\_\_\_\_
5. Estimated date(s) and method of shipment: daily overnight carrier  
carrier
6. Number of days analysis and data required after laboratory receipt of samples:  
Laboratory should report results within 30 days of receipt of samples.
7. Analytical protocol required (attach copy if other than a protocol currently used in this program): Method 9080 or 9081A (from 3rd edition of SW-846) will be used for the analysis of Cation Exchange Capacity of soils. If the soils contain appreciable amounts of clay minerals or are very calcareous use Method 9081A, otherwise use Method 9080A. Shipping documents will suggest method to be used based on field geologist's description.
8. Special technical instructions (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.): \_\_\_\_\_  
The laboratory will decide to use Method 9080A or 9081A on the basis of submitted field data and its own initial examination of each sample.  
In Method 9080A, titrants will be standardized directly or indirectly against Standard Reference Materials from the National Institute of Standards and Technology by either using the laboratory's standard operating procedures or purchasing appropriate commercial products. Titrations may be done potentiometrically (rather than calorimetrically), but the stipulated end points apply.  
In Method 9081A, sodium determination will be done by the laboratory's standard operating procedures, using a method which uses the quality control procedures and standards of the Contract Laboratory Program Statement of Work for Inorganics Analysis (ILM01). These include: initial and continuing calibrations (control limits of 90-110 percent), initial and continuing calibration blanks, preparation (reagent) blanks, duplicate sample analysis (control limit of 80-120 percent), and a laboratory control sample. Note that due to the prevalence of sodium, the preparation blank is critical. If necessary, the method of standard addition will be used.

9. Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain-of-Custody documentation, etc.). If not completed, format of results will be left to program discretion. \_\_\_\_\_

Submit all raw data including: 1) sample preparation, 2) choice of Method 9080A or 9081A and rationale, 3) bench records (reagent and titrant volumes, calculation worksheets, etc.), and 4) blank and other control samples, including standardization of titrants (Method 9080A) and calibration of sodium assay (Method 9081A). Records should be legible and sufficient to recalculate all assay results.

10. Other (use additional sheets or attach supplementary information as needed):

None.

11. Name of sampling/shipping contact Liz Uhl

Phone: (616) 942-9600 Ext. 404

\*12. Data Requirements

<u>Parameter</u>	<u>Detection Limit</u>	<u>Precision Desired (±% or Concentration)</u>
<u>CEC</u>	<u>Not applicable</u>	

13. QC Requirements

<u>Audits Required</u>	<u>Frequency of Audits</u>	<u>Limits (Percent of Concentration)</u>
<u>Lab Duplicate</u>	<u>1 per 10 samples</u>	<u>± 20%</u>
<u>Lab Blank</u>	<u>1 per 10 samples</u>	<u>2 x Method Detection Limit</u>

14. Action Required if Limits are Exceeded

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1. Take corrective action and reanalyze the samples

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2. Call Jan Pels (312/353-2720) or Chuck Ely (312/353-9087) SMU

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Please return this request to the Sample Management Office as soon as possible to expedite processing of your request for special analytical services. Should you have any questions or need any assistance, please contact your Regional representative at the Sample Management Office.

**ADDENDUM TO CEC IN SOILS SAS REQUEST**

Addendum to Section 7.

Laboratory data rejection and non-payment will be recommended if the lab uses methods other than those specified in this SAS request.

Addendum to Section 9.

All original tags, chain-of-custody forms, SAS packing list, airbills, and original data must be submitted to the Region with the time frame listed in Section 6 above.

Ground water concentration excursions above MCLs

1,2-Dibromo-3-chloropropane ) Downgradient of a septic system  
MW07SG - 8 ug/l: Round 2 ) Not tested in leachate samples?

Benzene ) only detected above MCL  
LF01 - 6 ug/l: Round 1 ) within the fill  
LF01 - 7 ug/l: Round 2 )

Vinyl Chloride  
MW06WB - 1 ug/l: Round 2  
MW08SB - 0.5 ug/l: Round 2  
MW09WB - 1 ug/l: Round 2  
MW09SB - 2 ug/l: Round 2  
LF01 - 14 ug/l: Round 1

Arsenic  
MW06SB - 85.1 ug/l: Round 1  
MW06SB - 126 ug/l: Round 2

Antimony  
MW09WB - 66.7 ug/l: Round 1  
MW09SG - 71.4 ug/l: Round 1

Nickel ) only detected above MCL  
LF01 - 185 ug/l: Round 1 ) within the fill  
LF01 - 279 ug/l: Round 2 )

Nitrate/Nitrite  
MW07SG - 26.4 ug/l: Round 1 (background 26.3 ug/l)  
downgradient of a septic system

Bold - detects  
Shaded - Above

Andrea - Won't use Type Bas trigger,  
but will use it as clean-up level??

End of August - look for MDOOR for  
look for August 10 letter to Rouland from Gene  
Copy Liz response to us if I find it. (Aug. 12?)  
(2 pr. pull-over boots  
if possible)

10:30